The Journal of the American Osteopathic Association

JULY 1960 • VOLUME 59

The cervical fascia—Lewis

The D.O. in disaster medicine

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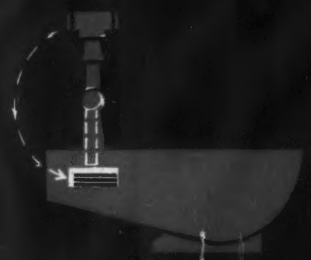

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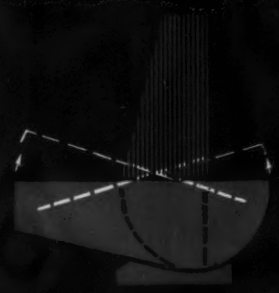

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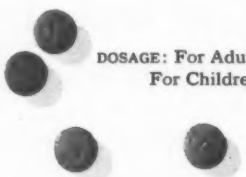

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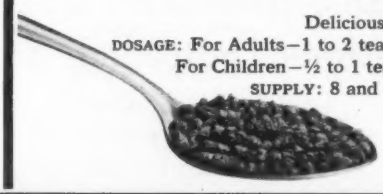

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1. Goddard, E.S.: in *Trifluoperazine: Further Clinical and Laboratory Studies*, Philadelphia, Lea & Febiger, 1959, pp. 21-27.

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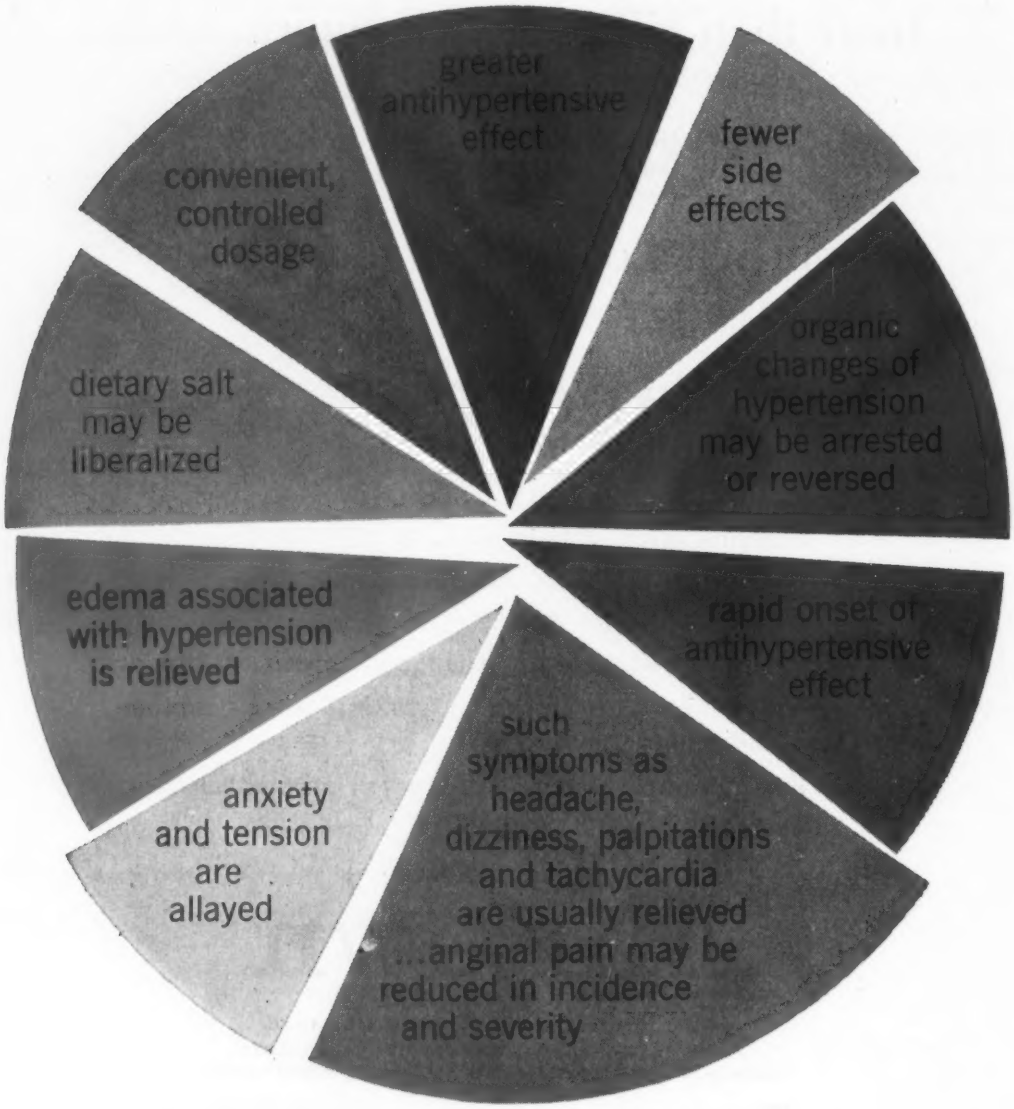
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For too fluid feces, an extraordinary ability to absorb free fecal water.

For too frequent evacuations, superior, yet selective, antimotility action.

Convenient tablet form; simple, uncomplicated dosage schedule (1 tablet q.i.d.).

Even where all other agents have failed – Sorboquel arrests long-standing, uncontrolled, exhausting diarrheas

Unexcelled Therapeutic Response: Results of the Administration of Sorboquel Tablets[1-8]

	No. of Patients	*Response*		
		Excellent	*Good*	*Poor*
Chronic Diarrhea*	**485**	335	76	74
		84.7%		**15.3%**
Acute Diarrhea**	**332**	288	22	22
		93.4%		**6.6%**

*Chronic diarrheas include irritable bowel syndrome, regional enteritis, diverticulitis and ulcerative colitis, postantibiotic enteritis, malabsorption syndrome, radiation proctitis, surgically short-circuited intestinal states. Diarrhea had persisted for more than a year in a large percentage with bowel movement frequency averaging from 5 to more than 10 a day. In most patients, SORBOQUEL controlled the condition within 3 days, even where other agents had failed.

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Dual-action **Sorboquel** arrests diarrhea even where all other agents have failed

The components in Sorboquel: the culmination of many years of development

SORBOQUEL Tablets combine two unique and hitherto unavailable antidiarrheal agents—polycarbophil and thihexinol methylbromide. Acting together, through different but complementary mechanisms, these components in SORBOQUEL *absorb* free fecal water and *quell* hypermotility and associated spasm to an exceptional degree.

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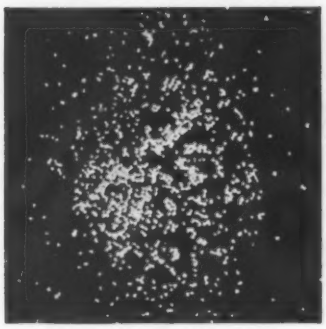
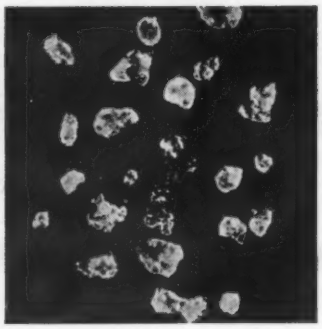


Dry State
Demonstration of the particulate nature of dry polycarbophil.



Swollen State
Note the particulate nature of swollen polycarbophil. Impaction is virtually impossible.

(a) (b) (c)

Demonstration of the dependence of swelling of polycarbophil on pH. (a) pH of stomach; (b) pH of duodenum; (c) pH of intestines.

A newly synthesized macromolecular substance exhibiting extraordinary capacity for absorption and retention of free fecal water[9-11] ■ the colloidal suspension is free-flowing, since, in the swollen or hydrated state, the particulate structure is retained[9] ■ exerts marked hydrosorptive action only on reaching the alkaline medium of the small intestine and colon ■ virtually free of impaction qualities ■ pharmacologically inert, not absorbed from the gut[12]

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SIDE EFFECTS: The incidence of side effects at recommended dosage is negligible. (The usual precautions when using parasympatholytic agents should be observed. *Complete information regarding the use of* SORBOQUEL TABLETS *is available on request.*

DUAL ACTION

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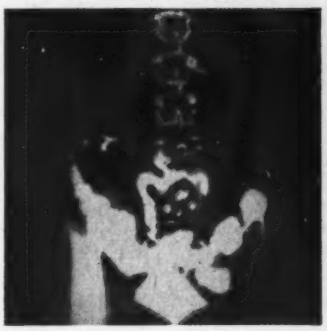
TABLETS

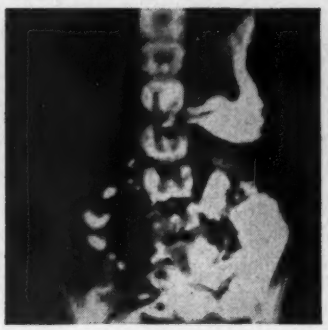
the first truly effective agent to control the dual problem of diarrhea: too fluid feces, too frequent evacuations

For too frequent evacuations, superior, yet selective, antimotility action

(through the parasympatholytic action of thihexinol methylbromide)



90-minute film demonstrating hypermotility of gastrointestinal tract in patient.



6-hour film after administration of thihexinol to patient showing marked inhibition of gastrointestinal motility.

(a) (b) (c)

Inhibition of methacholine-induced spasm by thihexinol in isolated rabbit intestine. Time of graph is 40 minutes. (a) normal motility; (b) methacholine, 40 mcg./L; (c) thihexinol, 10 mcg./ml.

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REFERENCES: 1. Hock, C. W.: Med. Times 88:320 (March) 1960. 2. Winkelstein, A.: Personal communication. 3. Berkowitz, D.: in press. 4. Lind, H. E.: Personal communication. 5. Seneca, H.: in press. 6. Riese, J. A.: Personal communication. 7. Gilbert, A. S.; Schwartz, I. R., and Matzner, M. J.: Submitted for publication. 8. Personal communications to Medical Department, White Laboratories, Inc. 9. Pimparker, B. D.; Paustian, F. F.; Roth, J. L. A., and Bockus, H. L.: To be published. 10. Texter, E. C. Personal communication. 11. Clinical reports to Medical Department, White Laboratories, Inc. 12. Grossman, A. J.; Batterman, R. C., and Leifer, P J.Am. Geriat. Soc. 5:187 (Feb.) 1957. 13. McHardy, G.; Browne, D.; McHardy, R.; Bodet, C., and Ward, S.: Am. J. Gastroenterol. 24:601 (Dec.) 1955. 14. Shay, H.: Personal communication. 15. Hirsh, H.: Personal communication. 16. Bercovitz, L. T.: J. Am. Geriat. Soc. 5:940 (Nov.) 1957.

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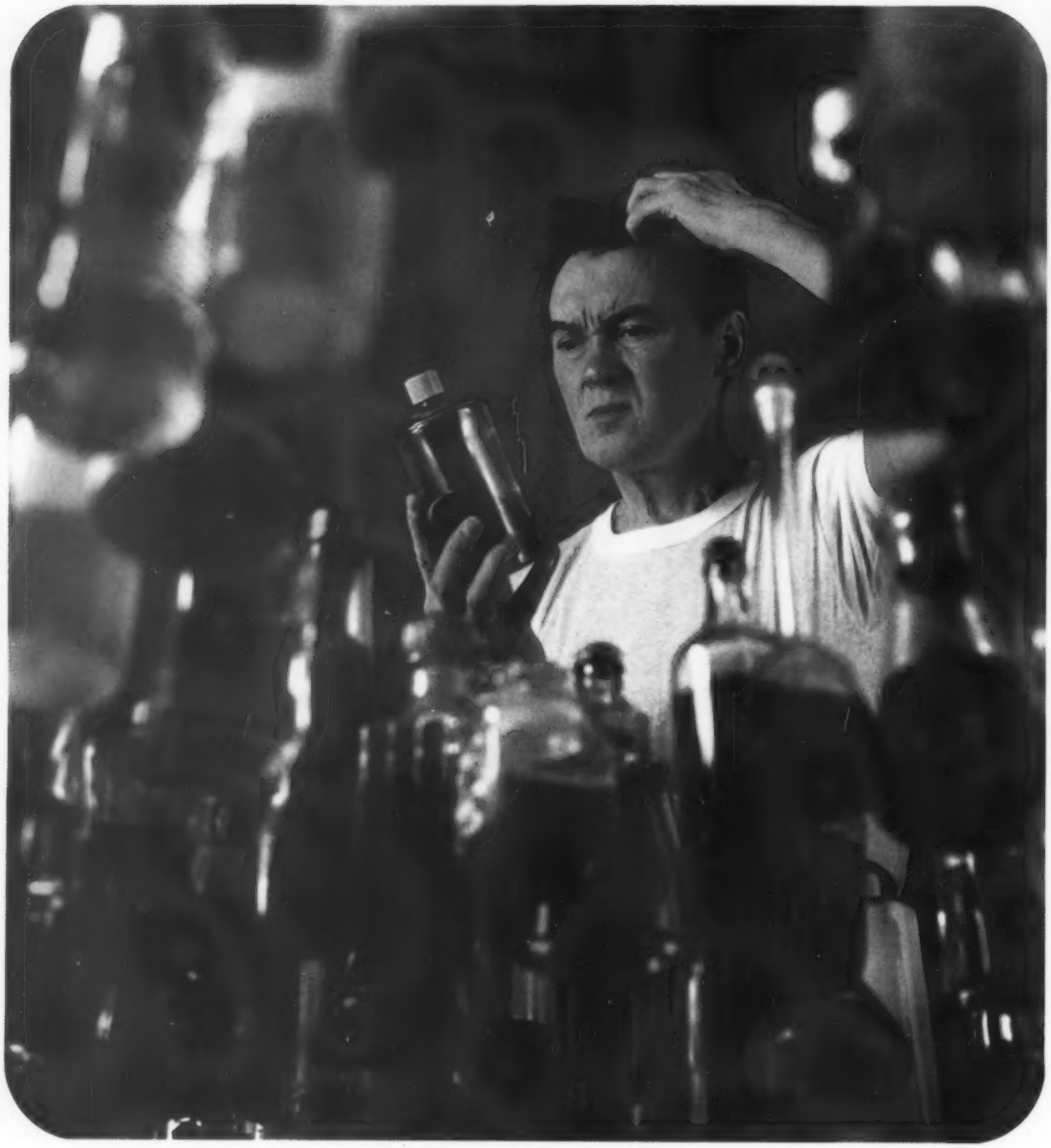

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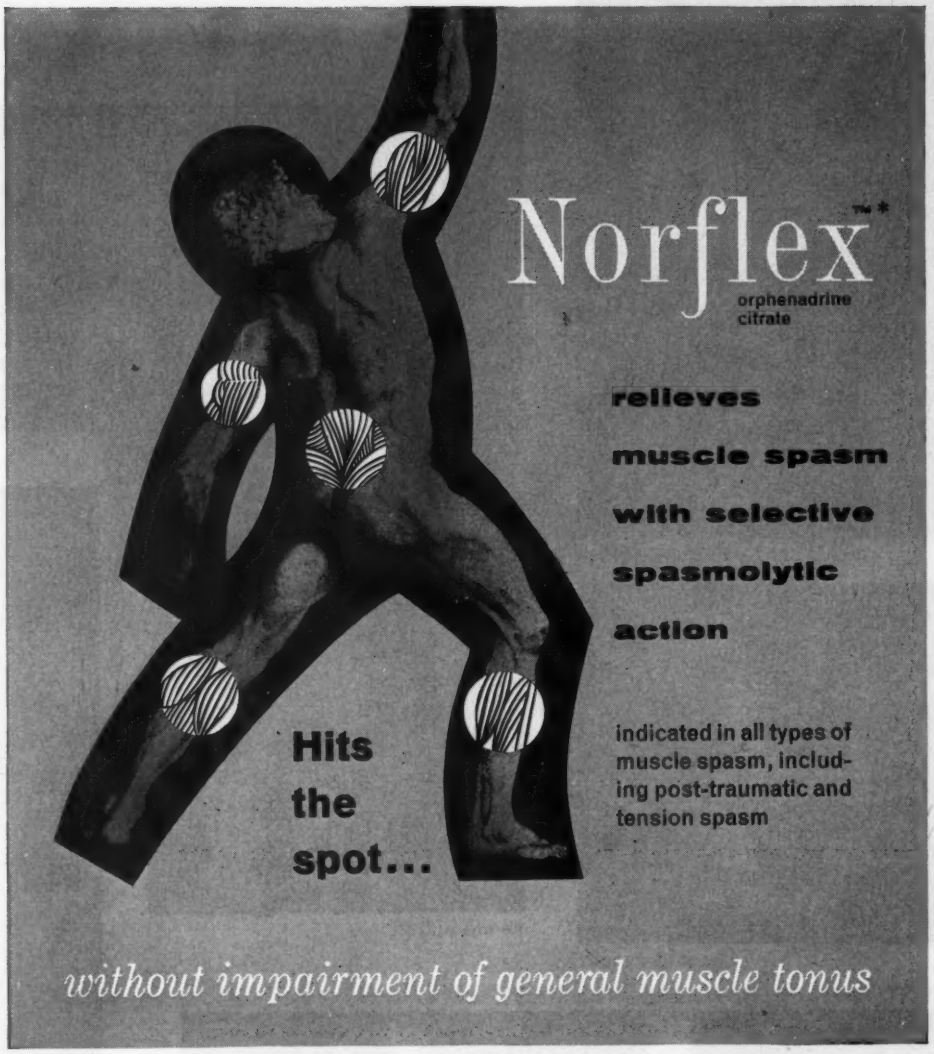
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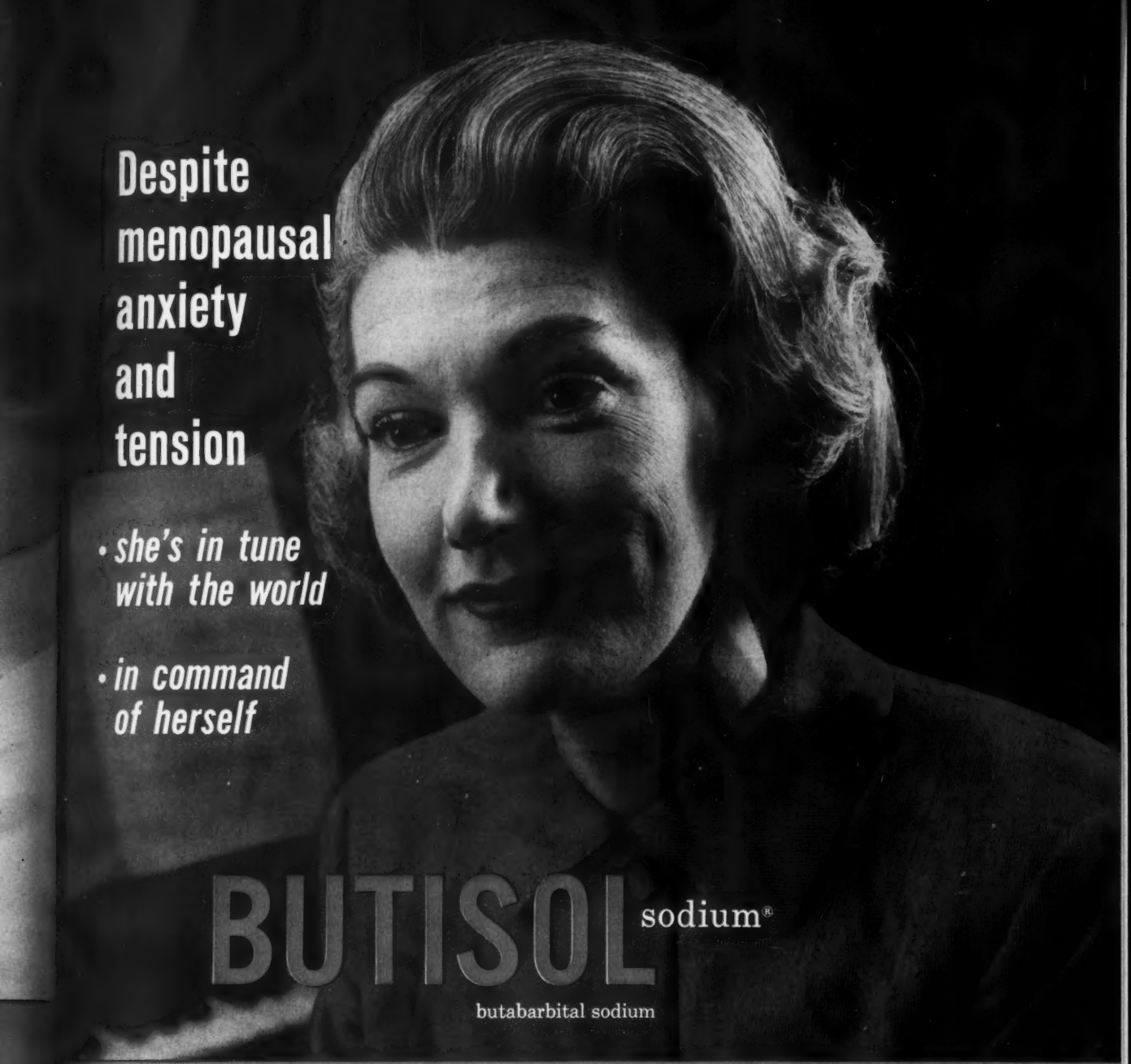
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*Batterman, R. C., Gressman, A. J., Leifer, P., and Mouratoff, G. J.: Clinical Re-evaluation of Daytime Sedatives, Postgrad. Med. 26:502 (Oct.) 1959.

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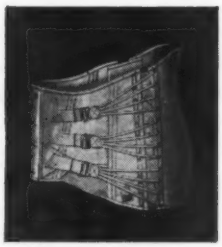

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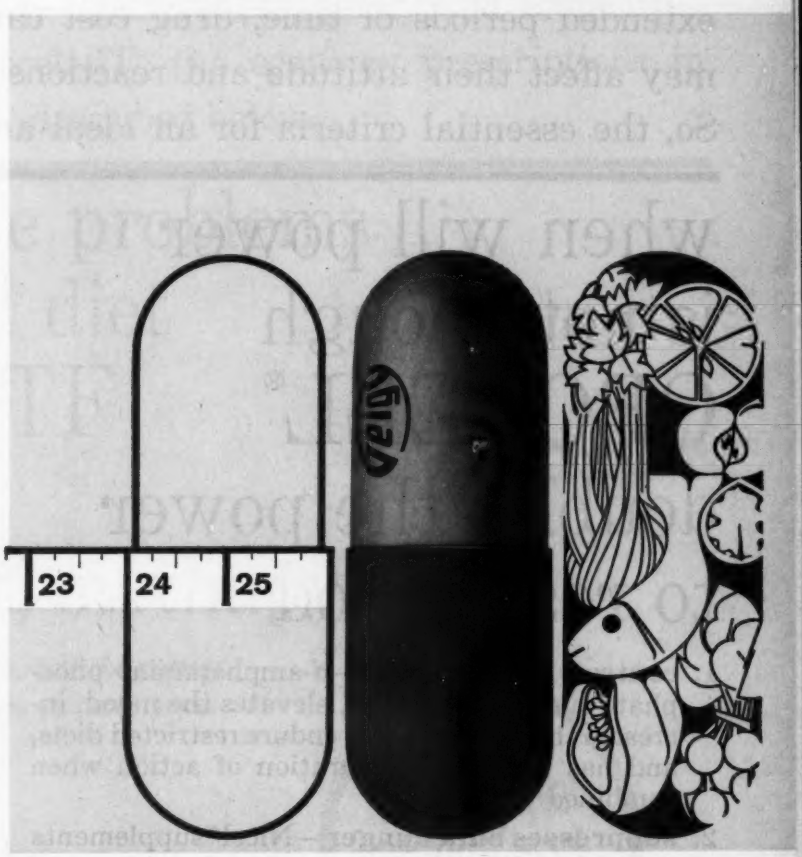

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How much is a drug really worth in obesity?

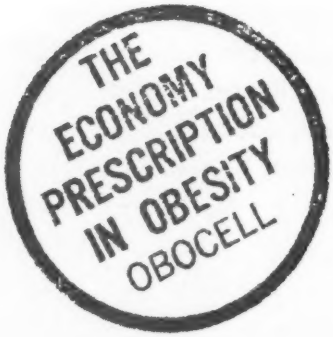
In all honesty, the two most important factors in treating the obese patient are your influence in the doctor-patient relationship and the diet itself. Still, some patients require concomitant drug therapy to help them stick to your prescribed dieting regimen.

Since many of these patients must be given the medication for extended periods of time, drug cost can be very important and may affect their attitude and reactions to the treatment.

So, the essential criteria for an ideal anorexigenic compound are

---

when will power is not enough OBOCELL® doubles the power to resist food



1. **controls the appetite**—*d*-amphetamine phosphate curbs the appetite, elevates the mood, increases the willingness to endure restricted diets, and has a prolonged duration of action when combined with Nicel.
2. **suppresses bulk hunger**—Nicel* supplements the reduced bulk intake and gives a sense of fullness.

Each Obocell tablet contains:

d-amphetamine phosphate (dibasic)	5 mg.
Nicel	160 mg.

*a special high viscosity methylcellulose

Neisler

TO PHYSICIANS
effectiveness and cost

not only effectiveness in curbing appetite and safety *but also economy*. And, *d*-amphetamine administered under a physician's supervision is still a drug of choice that satisfies all these criteria. It curbs the appetite and also does what some anorexigenic compounds do not do—elevates the mood and makes the patient more willing to stick to your prescribed dieting regimen.

To satisfy all three criteria—effectiveness, safety and economy—think of Obocell and Obocell-TF, the economy prescriptions in obesity. These products are described below.

---

to alleviate the problems of a restricted diet

OBOCELL-TF
(tension formula)

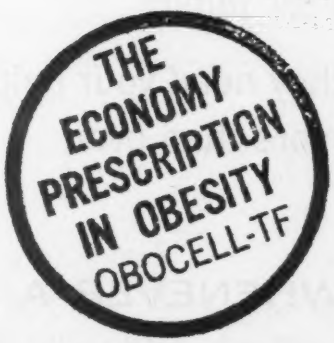
contains an antidisturbant, methapyrilene

- *provides a controlled lift in the mood of the patient*
- *calms anxious or tense individuals or those sensitive to sympathomimetic drugs*
- *controls the appetite*
- *suppresses bulk hunger*

Each Obocell-TF tablet contains:

Methapyrilene	25 mg.
d-amphetamine phosphate (dibasic)	5 mg.
Nicel	150 mg.

Dosage: 1 or 2 tablets before each meal with a full glass of water. A tablet may be given in the evening to combat the "night-eating syndrome."



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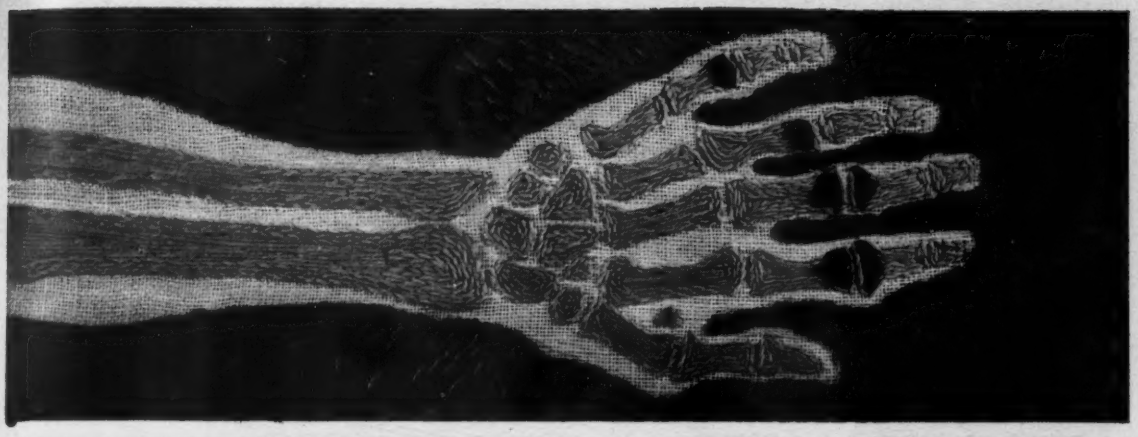
while they are planning
their family

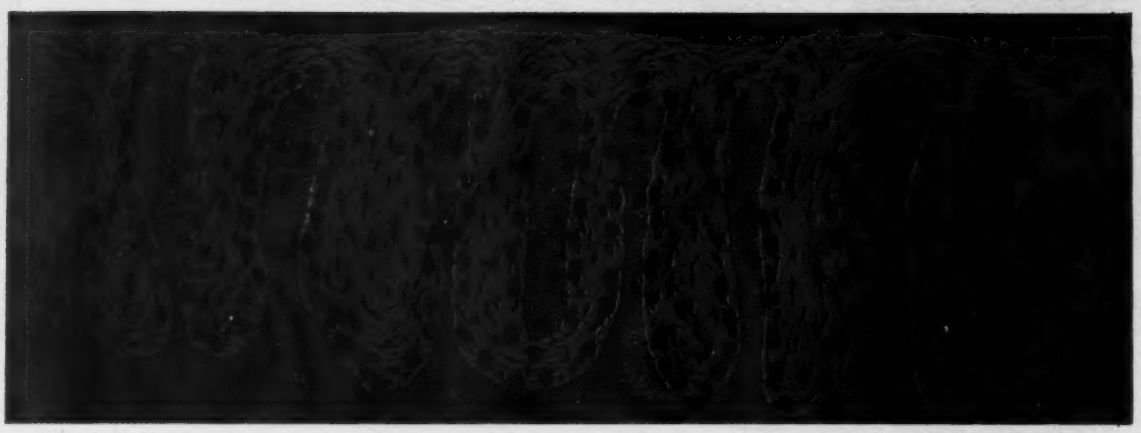
**they need your help
more than ever**

the most widely prescribed contraceptive

WHENEVER A DIAPHRAGM IS INDICATED

a promise fulfilled



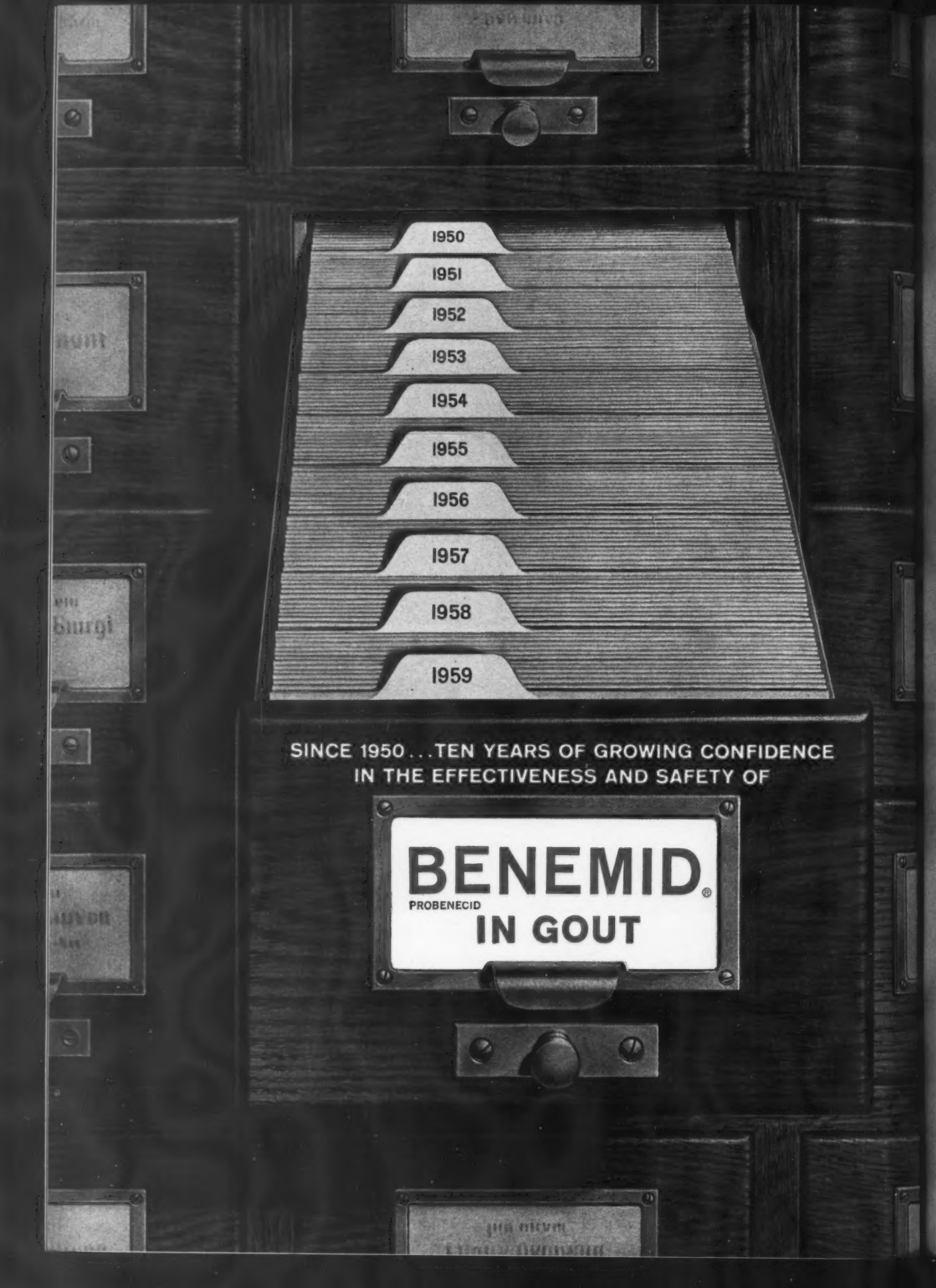


All corticosteroids provide symptomatic control in rheumatoid arthritis, inflammatory dermatoses, and bronchial asthma. They *differ* in the frequency and severity of side effects. Introduced in 1958, ARISTOCORT Triamcinolone bore the promise of high efficacy and relative safety.

Physicians today recognize that the promise has been fulfilled . . . as evidenced by the high rate of refilled ARISTOCORT prescriptions.

Aristocort® Triamcinolone LEDERLE

Lederle LEDERLE LABORATORIES, A Division of AMERICAN CYANAMID COMPANY, Pearl River, N. Y.


1950
1951
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SINCE 1950 . . . TEN YEARS OF GROWING CONFIDENCE
IN THE EFFECTIVENESS AND SAFETY OF
BENEMID®
PROBENECID
IN GOUT

"Since the introduction of probenecid [BENEMID] into clinical medicine...a great deal of justifiable enthusiasm has been evidenced and numerous reports on the use of this drug have appeared.... All patients who have gout should be offered prolonged therapy with a safe uricosuric agent such as probenecid...."[1]

1. Bartels, E. C., and Matossian, G. S.: Gout: Six-Year Follow-Up on Probenecid (BENEMID) Therapy, Arthritis and Rheumatism 2:193, June 1959.

BENEMID is "remarkably free from toxic side reaction....Patients tolerate the drug well."[2]

2. Lockie, L. M., and Talbott, J.: Does Your Patient Have Gout?, Scientific Exhibit, American Medical Association, New York City, June 3-7, 1957.

"Probenecid [BENEMID] is the drug of choice as a uricosuric agent. Treatment should be instituted with 0.25 Gm. given twice daily for one week, then increased to 0.5 Gm. twice daily thereafter, without interruption."[3]

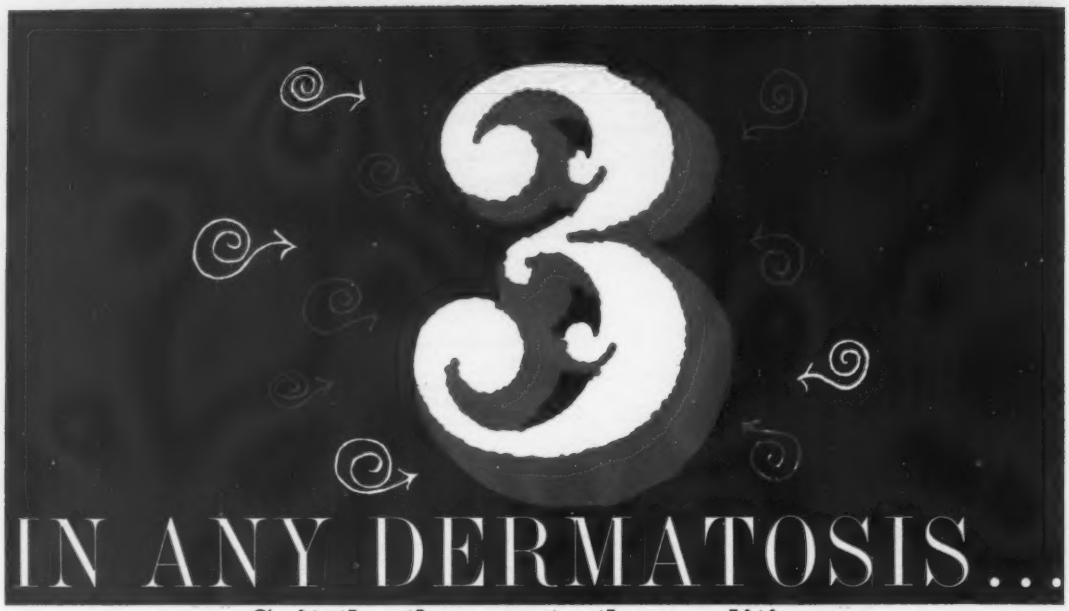
3. Kron, K. M., Hermann, L. F., Smith, R. T., and Richards, J. C.: Which Rheumatic Disease?, Scientific Exhibit, American Medical Association, Atlantic City, June 8-12, 1959.

Supply: 0.5 Gm. tablets, bottles of 100 and 1000.

For additional information, write Professional Services, Merck Sharp & Dohme, West Point, Pa.

MSD MERCK SHARP & DOHME, DIVISION OF MERCK & CO., INC., PHILADELPHIA 1, PA.

BENEMID IS A TRADEMARK OF MERCK & CO., INC.



Suit the therapy to the condition

remember this topical trio for personalized treatment

- **each stops itch and inflammation quickly**
- **each instantly restores and maintains the normal protective acid pH**

1 *the best therapeutic beginning[1] in acute skin inflammation*

DOMEBORO® TABLETS OR POWDER PACKETS pH 4.2

The Original Modernized Burow's Solution

convenient wet dressings stay moist longer... maintain constant pH... speed healing... reduce inflammation.

Tablets in containers of 12, 100, 500, 1000.
Powder Packets in boxes of 12 and 100.

2 *maximum steroid benefits at lower dosage—lower cost*

CORT-DOME®

CREME OR LOTION pH 4.6

Hydrocortisone Free Alcohol in ACID MANTLE®

Most universally employed anti-inflammatory steroid for topical use.

½% hydrocortisone in exclusive ACID MANTLE vehicle "is about as effective as 1% in most conditions treated."[2]

½%, 1% or 2% hydrocortisone free alcohol in water-miscible ACID MANTLE vehicle. In ½ ounce squeeze bottles, each with special soft plastic ear-applicator.

3 *if infection complicates inflammation*

NEO-CORT-DOME™

CREME OR LOTION pH 4.6

Hydrocortisone Free Alcohol plus Neomycin in ACID MANTLE®

½% or 1% hydrocortisone free alcohol and 5 mg. per Gm. neomycin sulfate in exclusive water-miscible ACID MANTLE vehicle. In ½ ounce squeeze bottles, each with special soft plastic ear-applicator.

1. Jones, E. H.: Eye, Ear, Nose & Throat Month. *38*:460, 1959. 2. Lockwood, J. H.: Bull. A. Mil. Dermatologists *4*:2, 1955.

DOME CHEMICALS INC. 125 West End Avenue / New York 23, N. Y. • Los Angeles / Montreal
World Leader in Dermatologicals

When summertime chores bring on LOW BACK PAIN

Trancopal®

Brand of chlormezanone

relaxes skeletal muscle spasm— ends disability.

When any of a host of summer activities brings on low back pain associated with skeletal muscle spasm, your patient need not be disabled or even uncomfortable. The spasm can be relaxed with Trancopal, and relief of pain and disability will follow promptly.

Lichtman[1,2] used Trancopal to treat patients with low back pain, stiff neck, bursitis, rheumatoid arthritis, osteoarthritis, trauma, and postoperative muscle spasm. He noted that Trancopal produced satisfactory relief in 817 of 879 patients (excellent results in 268, good in 448 and fair in 101).

Gruenberg[3] prescribed Trancopal for 70 patients with low back pain and observed that it brought marked improvement to all. "In addition to relieving spasm and pain, with subsequent improvement in movement and function, Trancopal reduced restlessness and irritability in a number of patients."[3] In another series, Kearney[4] reported that Trancopal produced relief in 181 of 193 patients suffering from low back pain and other forms of musculoskeletal spasm.

Trancopal enables the anxious patient to work or play. According to Gruenberg, "In addition to relieving muscle spasm in a variety of musculoskeletal and neurologic conditions, Trancopal also exerts a marked tranquilizing action in anxiety and tension states."[3] Kearney[4] found "... that Trancopal is the most effective oral skeletal muscle relaxant and mild tranquilizer currently available."

Side effects are rare and mild. "Trancopal is exceptionally safe for clinical use."[3] In the 70 patients with low back pain treated by Gruenberg,[3] the only side effect noted was mild nausea which occurred in 2 patients. In Lichtman's group, "No patient discontinued chlormethazanone [Trancopal] because of intolerance."[1]

How Supplied: Trancopal Caplets®
200 mg. (green colored, scored), bottles of 100.
100 mg. (peach colored, scored), bottles of 100.

Dosage: Adults, 200 or 100 mg. orally three or four times daily. Relief of symptoms occurs in from fifteen to thirty minutes and lasts from four to six hours.

References: *1.* Lichtman, A. L.: *Kentucky Acad. Gen. Pract. J.* 4:28, Oct., 1958. *2.* Lichtman, A. L.: Scientific Exhibit, Internat. Coll. Surgeons, Miami Beach, Fla., Jan. 4-7, 1959. *3.* Gruenberg, Friedrich: *Current Therap. Res.* 2:1, Jan., 1960. *4.* Kearney, R. D.: *Current Therap. Res.* 2:127, April. 1960.

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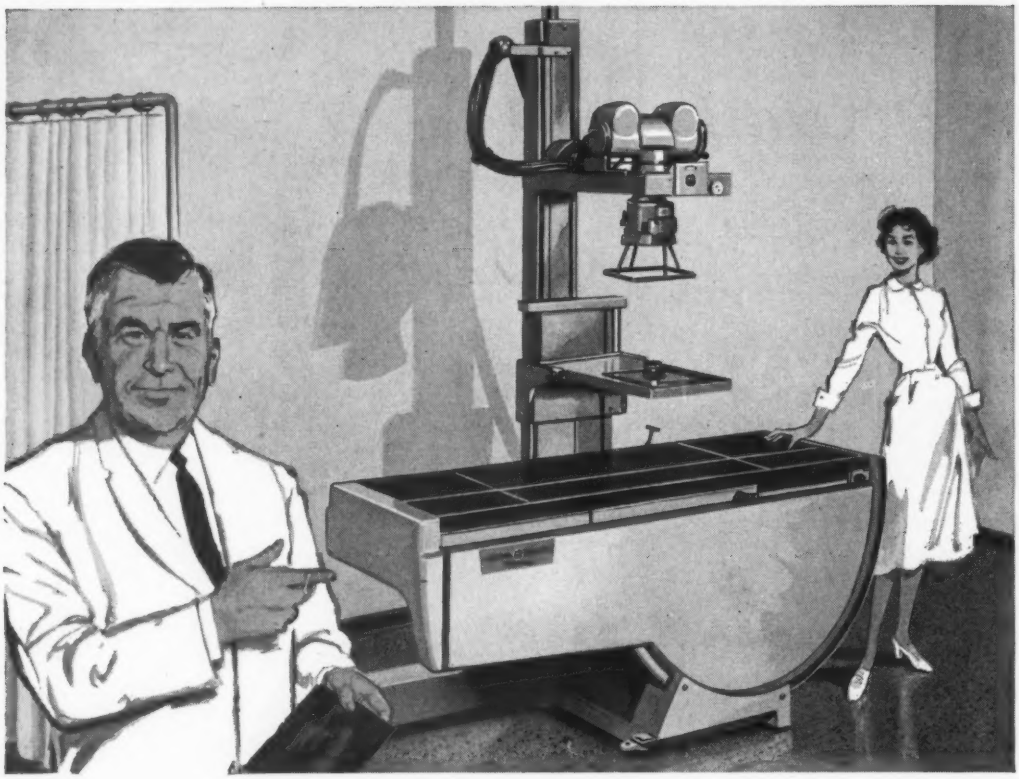

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Few who purchase x-ray equipment have time to thoroughly test the quality of materials, workmanship and technical performance offered by all the makes of x-ray units. And happily this is not necessary.

The manufacturer's *reputation* is worth more than anything else to you in choosing x-ray equipment, one of the most complex professional investments you will ever face.

General Electric has created "just what the doctor ordered" in the 200-ma Patrician, in terms of both reasonable cost and operating qualities. Here diagnostic x-ray is ideally tailored to *private practice*. Patrician provides everything you need for radiography and fluoroscopy — and with consistent end results, since precise radiographic calibration is as much a part of the Patrician combination as it is of our most elaborate installations. Ask your G-E x-ray representative about the Patrician "package," or return our coupon below for illustrated literature.

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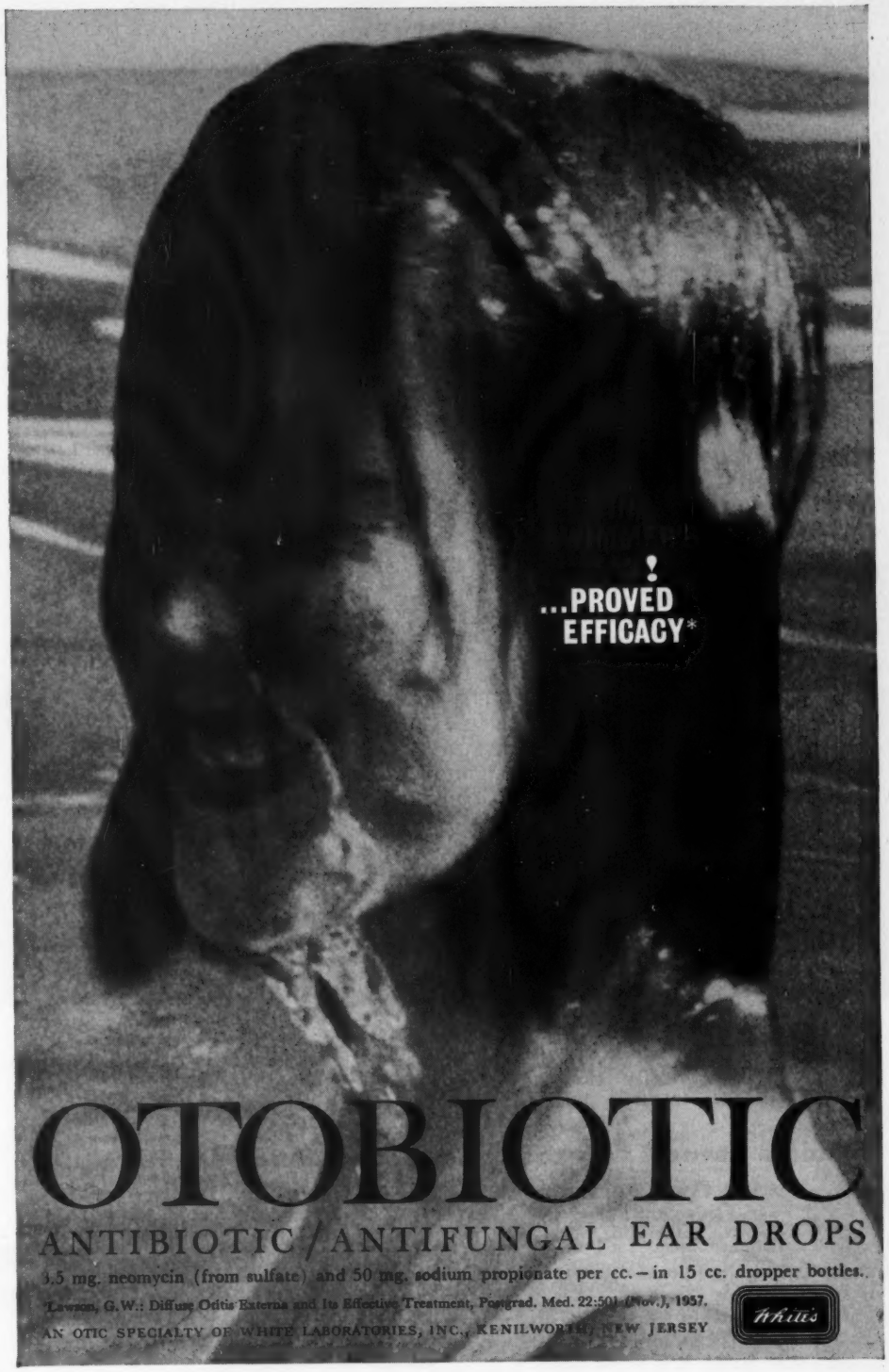
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3.5 mg. neomycin (from sulfate) and 50 mg. sodium propionate per cc. – in 15 cc. dropper bottles.
Lawson, G.W.: Diffuse Otitis Externa and Its Effective Treatment, Postgrad. Med. 22:501 (Nov.), 1957.
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White's

The Aged

–and a natural way to meet their special nutrition needs with fresh-flavor, economical Carnation Instant.

Finicky appetites, dental problems, food costs —one or more often play a part in contributing to poor diet for the elderly.

A pleasant *natural* way to help improve their nutritional status is the excellent new food—*new Carnation Instant Nonfat Dry Milk mixed 25% over-strength.*

One-third cup extra crystals per liquid quart when mixing provides 25% more calcium, protein, and B-vitamins than ordinary nonfat milk. Because your patients can add this additional amount, they get *needed* nutrients – *without* excessive calories. And the richer, more delicious flavor of nonfat milk mixed over-strength is a *natural* way to *extra* nutrition they'll enjoy. Costs them only 10¢ a quart.

ANOTHER QUALITY PRODUCT OF CARNATION COMPANY, LOS ANGELES 36, CALIFORNIA

CLINICAL REMISSION IN A "PROBLEM" ARTHRITIC

In rheumatoid arthritis with diabetes mellitus. A 54-year-old diabetic with a four-year history of arthritis was started on DECADRON, 0.75 mg./day, to control severe symptoms. After a year of therapy with 0.5 to 1.5 mg. daily doses of DECADRON, she has had no side effects and diabetes has not been exacerbated. **She is in clinical remission.***

New convenient b.i.d. alternate dosage schedule: the degree and extent of relief provided by DECADRON allows for b.i.d. maintenance dosage in many patients with so-called "chronic" conditions. Acute manifestations should first be brought under control with a t.i.d. or q.i.d. schedule.

Supplied: As 0.75 mg. and 0.5 mg. scored, pentagon-shaped tablets in bottles of 100. Also available as Injection DECADRON Phosphate. Additional information on DECADRON is available to physicians on request. DECADRON is a trademark of Merck & Co., Inc.

*From a clinical investigator's report to Merck Sharp & Dohme.

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Dexamethasone

TREATS MORE PATIENTS MORE EFFECTIVELY

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Children are happier when doctors choose Fleet® Enema

They are more willing to accept this ready-to-use pediatric enema because they are spared the ordeal of complicated old-style procedures. The compact Fleet Enema takes less than a minute to give and avoids the discomfort of large volumes of liquid. Insertion is made easy and safe because of the *pre-lubricated, anatomically correct* 2-inch rectal tube.[1] Fleet Enema can be prescribed with confidence as "a safe and effective enema preparation for even small children."[2]

Widely useful for a variety of diagnostic and therapeutic purposes—even for your patients on sodium-restricted regimens.[3] Systemic absorption is negligible.[2,3]

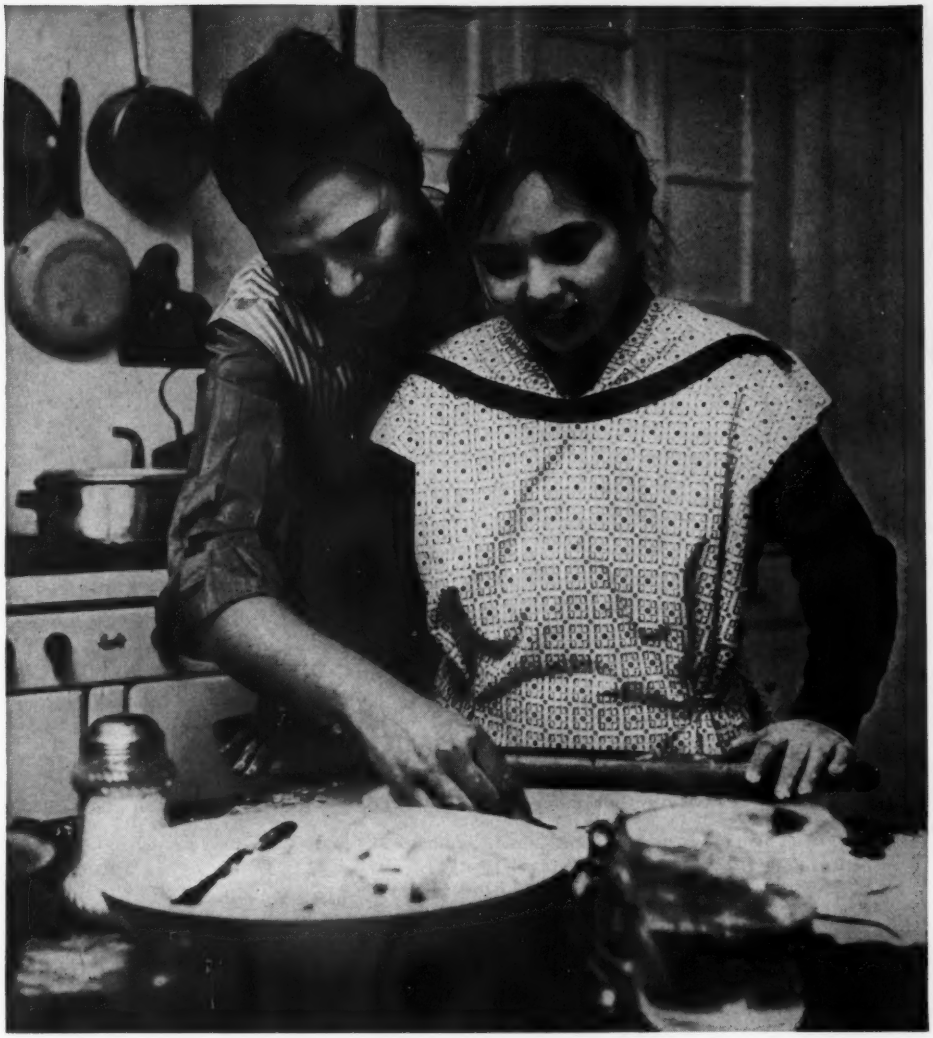
Pediatric size, **2¼ fl.oz.** ***Regular size,*** **4½ fl.oz.** ***100 cc. contains:*** **16 Gm. sodium biphosphate and 6 Gm. sodium phosphate.** ***Also available:*** **Fleet Oil Retention Enema, 4¼-fl.oz. ready-to-use unit containing Mineral Oil U.S.P.**

READY-TO-USE SQUEEZE BOTTLE

Fleet **FLEET® ENEMA PEDIATRIC**

1. Frech, H. C., and Lanier, L. R., Jr.: Am. J. Obst. & Gynec. 74:1146, 1957. 2. Way, W. G., et al.: Virginia M. Month. 85:291, 1958. 3. Hellman, L. D.: To be published.

C. B. FLEET CO., INC. LYNCHBURG, VIRGINIA



Past tense

For the first time in months, this mom really feels like joining in the family fun. In the past, she had been far too tense either to devote a casual hour to usual mother-daughter diversions or to answer the host of questions invariably posed by an inquisitive youngster.

She actually enjoys helping to "co-bake" an apple pie, because she "feels good" and is genuinely interested. The reason: Levanil does not isolate or insulate, as many tranquilizers do.

for equanimity without somnolence

Levanil

Trademark, Reg. U.S. Pat. Off.
—brand of ectylurea, Upjohn

The Upjohn Company
Kalamazoo, Michigan

Upjohn

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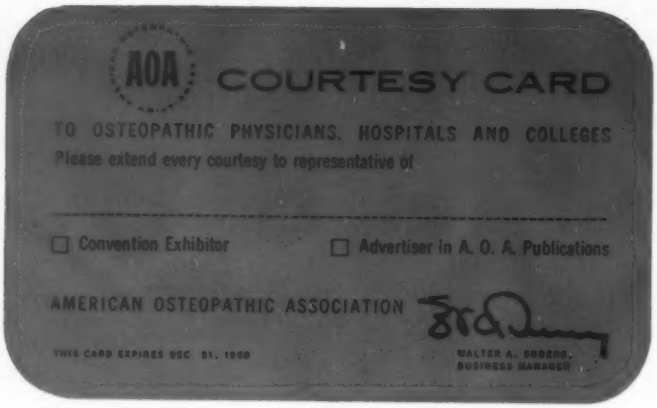

Extend Every Courtesy To Your Detail Men

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NINE REASONS WHY MORE AND MORE PHYSICIANS ARE USING THE CONTOURING *Koro-Flex*

1. Reduces your fitting instruction time.
2. Patient ease of insertion—automatic placement.
3. Develops patients' confidence. Easy to use.
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9. Aesthetically acceptable. Is most comfortable. KORO-FLEX (contouring) Diaphragms may be used where ordinary coil-spring diaphragms are indicated and for Flat rim (Mensinga)-type as well.

Recommend: KORO-FLEX Compact, the ONLY compact that provides the arcing diaphragm (60-95 mm), jelly *and* Koromex cream (trial size). *More satisfied patients result from trying both and then selecting the one best suited to physiological requirements.* Eliminates guessing. Supplied in feminine clutch-style bag with zipper closure.

Available in all prescription pharmacies.
Write for descriptive literature.
Always insist on the use of time-tested Koromex Jelly or Cream with diaphragm.

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Your surgical convalescent feels better because he is better with

Durabolin®

(Nandrolone phenpropionate injection, ORGANON)

1 cc. once each week

for safe potent anabolic stimulation

+ to maintain positive nitrogen balance
+ to promote rapid wound healing
+ to restore appetite, strength, vitality
+ to shorten convalescence, save nursing time
+ to reduce the cost of recovery

Supplied: 1-cc. ampuls (box of three) and 5-cc. vials, 25 mg. nandrolone phenpropionate/cc.

Adults: 1 cc. i.m. each week, or 2 cc. every other week.

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A-48

recurring infections? systemic reactions?

HARDLY EVER!

in urologic patients taking MANDELAMINE®

brand of methenamine mandelate

This is why Mandelamine is a most effective urinary antibacterial, especially for stubborn disorders. Urine-specific Mandelamine eradicates most pathogens commonly encountered in chronic urinary infections—even strains resistant to antibiotics and sulfonamides. Mandelamine—antibacterial, but *not* an antibiotic—does not produce resistant mutants. And systemic reactions are rarely seen. Mandelamine... effective, well-tolerated, economical. Average adult dose, 2 Mandelamine Hafgrams® q.i.d.

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MORRIS PLAINS, N.J.

MA-6P02

by every standard

the drug for "morning sickness"

Bonine®

brand of meclizine hydrochloride

IN BRIEF

BONINE is an antiemetic which provides rapid and prolonged protection against nausea and vomiting due to a variety of causes. A single dose of BONINE is usually effective for 24 hours. Thus, BONINE can be taken at bedtime to help prevent "next morning" sickness.

INDICATIONS: Valuable in the symptomatic relief of nausea and vomiting of pregnancy. Also indicated for motion sickness, radiation sickness, vertigo associated with Ménière's syndrome, labyrinthitis, fenestration procedures, vestibular dysfunction, and dizziness associated with cerebral arteriosclerosis.

ADMINISTRATION AND DOSAGE: For control of nausea and vomiting of pregnancy, a daily dose of 25 to 50 mg. is usually effective. For dosage schedules in other indications, see package insert.

SIDE EFFECTS: *Not* a phenothiazine, the side effects reported in association with Bonine have been mild and/or transient and consist of occasional drowsiness, dryness of the mouth, and blurred vision. Drowsiness is seen less frequently with BONINE in therapeutic dosages than with most other effective antiemetics.

PRECAUTIONS: As with other antihistaminic compounds, the physician should inform patients of the need for caution in driving a car or when engaged in other activities requiring alertness. There are no known contraindications to BONINE.

SUPPLIED: BONINE Tablets, scored, tasteless, 25 mg. BONINE Chewing Tablets, mint-flavored, 25 mg. BONINE Elixir, cherry-flavored, 12.5 mg. per teaspoonful (5 cc.).

More detailed professional information available on request.

Science for the world's well-being™ Pfizer PFIZER LABORATORIES *Division, Chas Pfizer & Co., Inc. Brooklyn 6, New York*

urinary pain?
frequency?

STOPS IN 30 MINUTES!

after the first dose of

PYRIDIUM®

brand of phenylazo-diamino-pyridine HCl

Patients on Pyridium experience welcome relief from urinary pain, burning, frequency and urgency—usually within 30 minutes. And Pyridium may be given with *any* urinary antibacterial. In fact, its recommended daily dosage of two 0.1-Gm. tablets t.i.d. provides a greater analgesic effect in adults than the recommended daily dosage of many fixed antibacterial-analgesic combinations. Because Pyridium is extremely well tolerated, you can provide pain relief until the underlying infection is completely controlled with the antibacterial of your choice. So next time you see a patient with a painful urinary infection, prescribe Pyridium.

WARNER CHILCOTT
MORRIS PLAINS, N.J.

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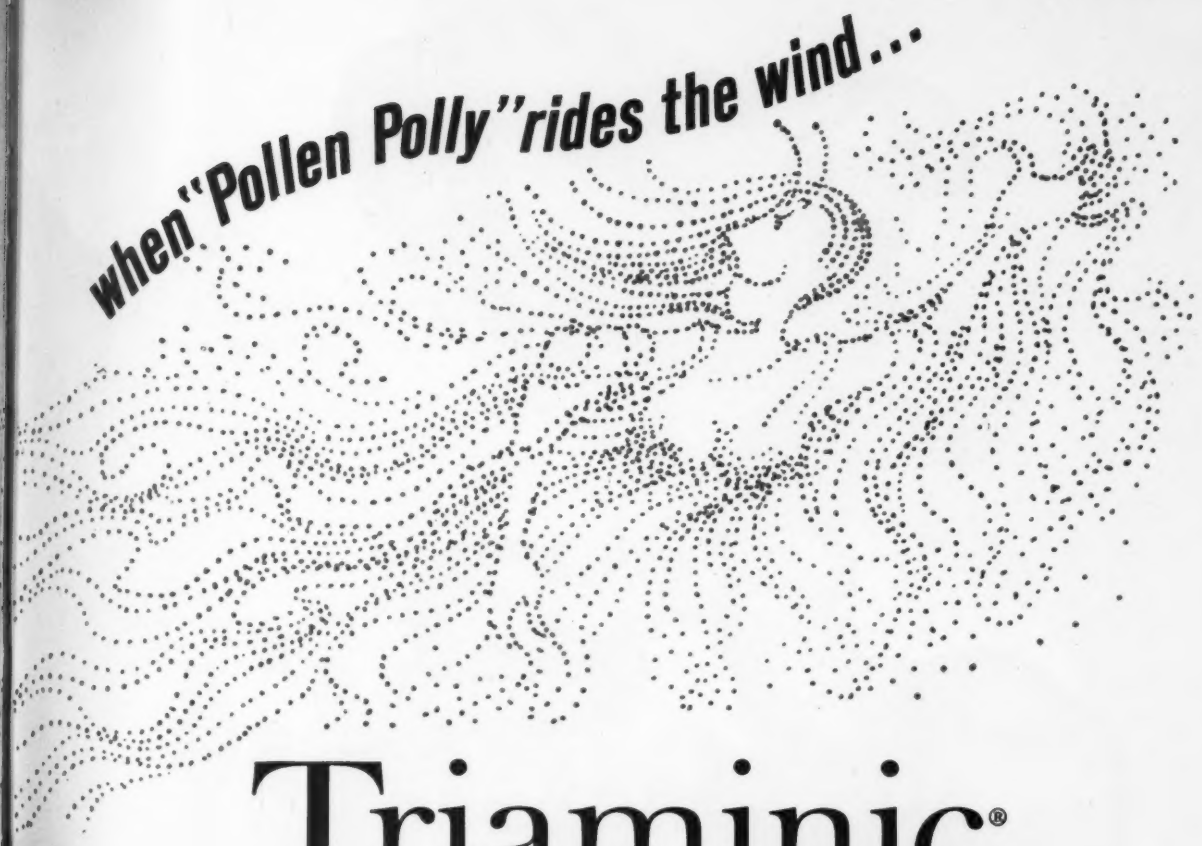


Triaminic®

...relief from pollen allergies

more complete than antihistamines alone... more thorough than nose drops or sprays

The miseries of respiratory allergy can be relieved so effectively with Triaminic.[1-5] Triaminic contains two antihistamines plus the decongestant, phenylpropanolamine, to help shrink the engorged capillaries, reduce congestion and bring relief from rhinorrhea and sinusitis.[1] Oral administration distributes medication to *all* respiratory membranes without risk of "nose drop addiction" or rebound congestion.[2,3]

Each Triaminic timed-release Tablet provides:

Phenylpropanolamine HCl	50 mg.
Pheniramine maleate	25 mg.
Pyrilamine maleate	25 mg.

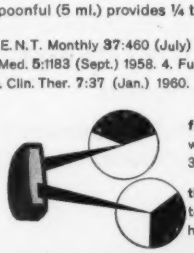
also available:

TRIAMINIC JUVELETS® ½ the formulation of the Triaminic Tablet with timed-release action.

TRIAMINIC SYRUP each teaspoonful (5 ml.) provides ¼ the formulation of the Triaminic Tablet.

References: 1. Fabricant, N. D.: E. E. N. T. Monthly **37**:460 (July) 1958. 2. Lhotka, F. M.: Illinois M. J. **112**:259 (Dec.) 1957. 3. Farmer, D. F.: Clin. Med. **5**:1183 (Sept.) 1958. 4. Fuchs, M.; Bodi, T.; Mallen, S. R.; Hernando, L., and Moyer, J. H.: Antibiotic Med. & Clin. Ther. **7**:37 (Jan.) 1960. 5. Halpern, S. R., and Rabinowitz, H.: Ann. Allergy **18**:36 (Jan.) 1960.

Relief is prompt and prolonged because of this special timed-release action



first—the outer layer dissolves within minutes to produce 3 to 4 hours of relief

then—the core disintegrates to give 3 to 4 more hours of relief

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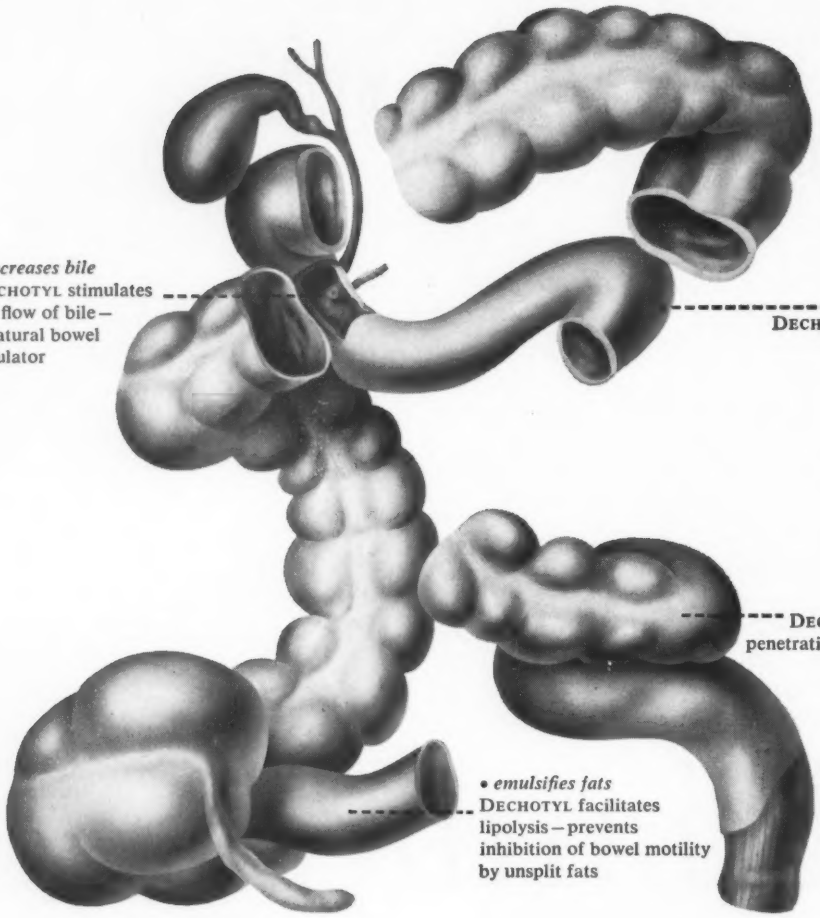
• increases bile
DECHOTYL stimulates the flow of bile—a natural bowel regulator
• improves motility
DECHOTYL gently stimulates intestinal peristalsis
• softens feces
DECHOTYL expedites fluid penetration into bowel contents
• emulsifies fats
DECHOTYL facilitates lipolysis—prevents inhibition of bowel motility by unsplit fats

helps free your patient from both... constipation and laxatives

DECHOTYL®

TRABLETS*

well tolerated...gentle transition to normal bowel function

Recommended to help convert the patient—naturally and gradually—to healthy bowel habits. Regimens of one week or more are suggested to assure maintenance of normal rhythm and to avoid the repetition of either laxative abuse or constipation.

Average adult dose: Two TRABLETS at bedtime as needed or as directed by a physician. *Action usually is gradual, and some patients may need 1 or 2* TRABLETS *3 or 4 times daily.*

Contraindications: Biliary tract obstruction; acute hepatitis.

DECHOTYL TRABLETS provide 200 mg. DECHOLIN,® (dehydrocholic acid, AMES), 50 mg. desoxycholic acid, and 50 mg. dioctyl sodium sulfosuccinate, in each trapezoid-shaped, yellow TRABLET. Bottles of 100.

*AMES T.M. for trapezoid-shaped tablet.

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PATIENTS
PREFER

titralac®

"teaspoon dose"
LIQUID

UNIQUE ANTACID WITH MILK-LIKE ACTION

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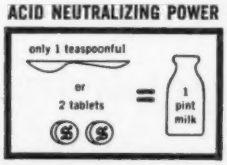

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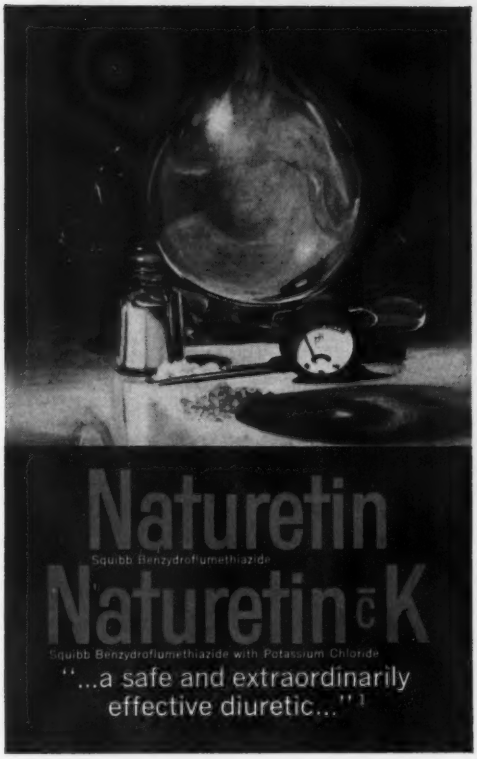

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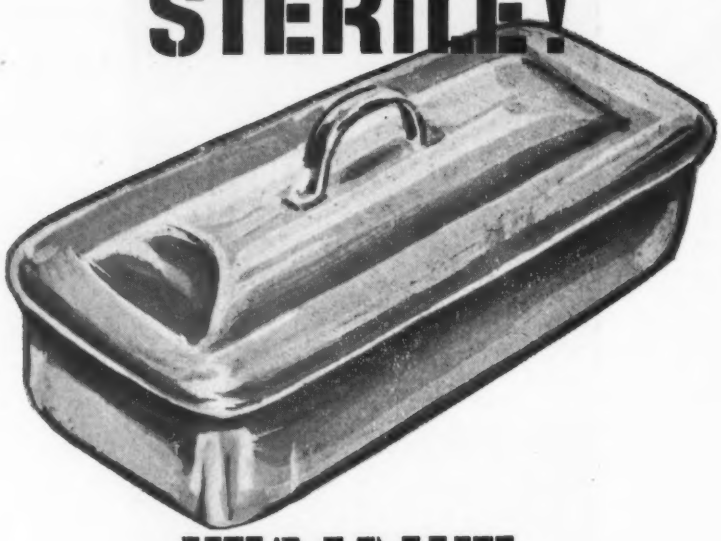

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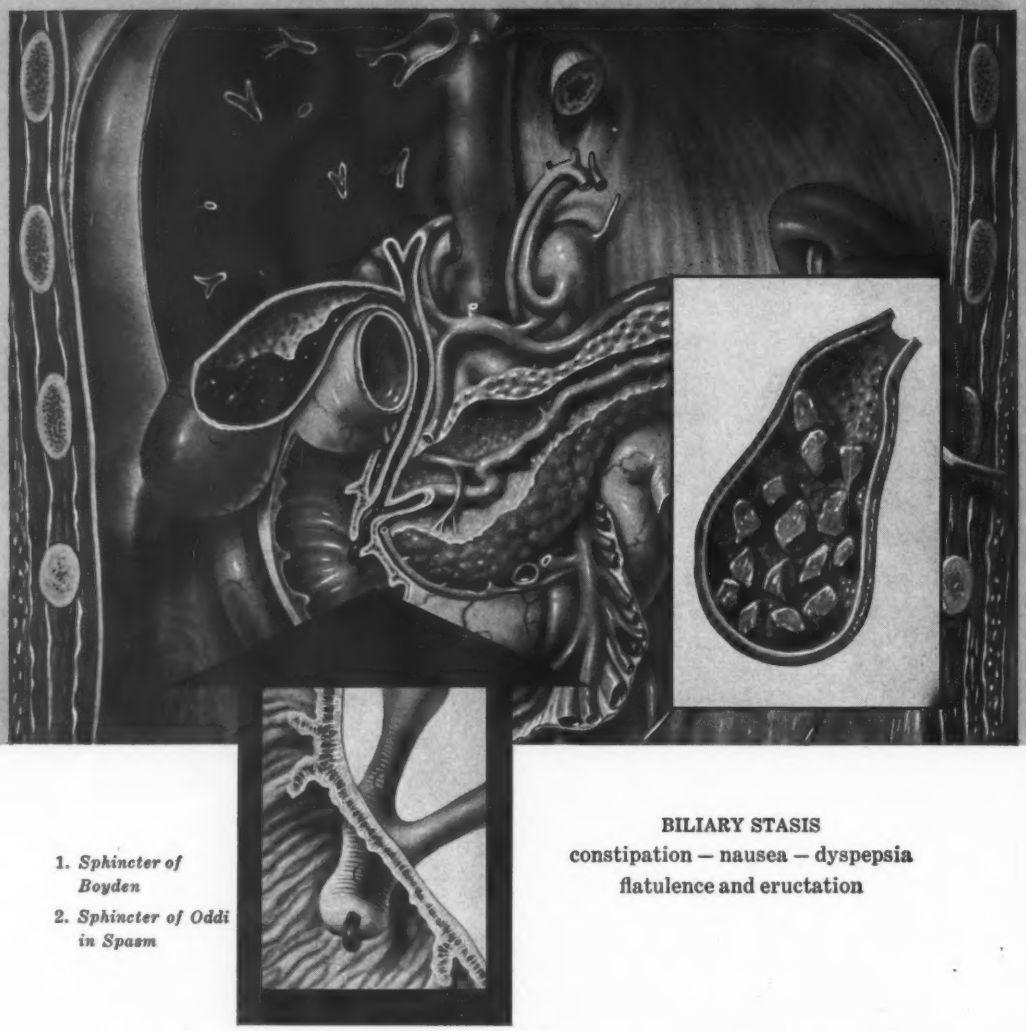

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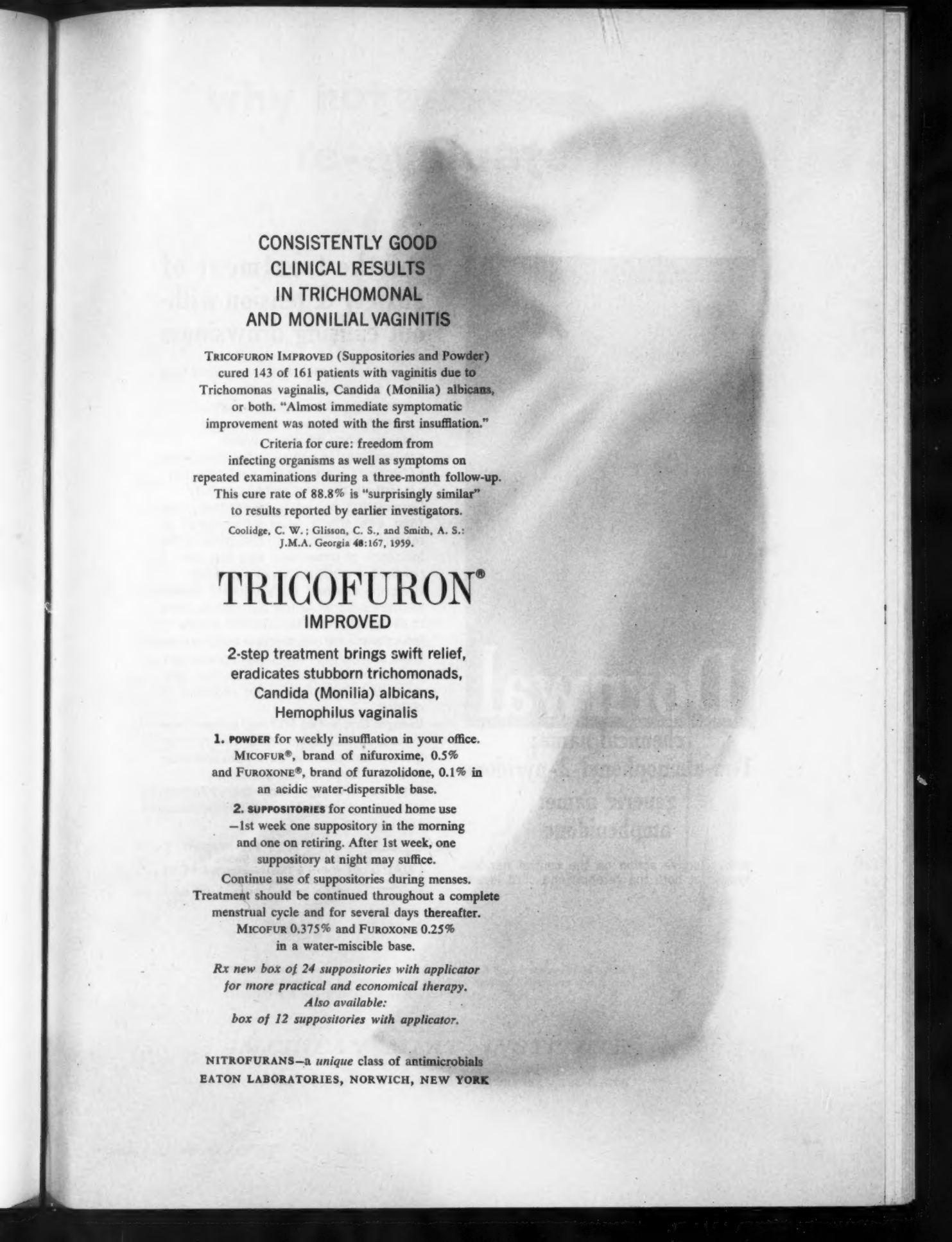

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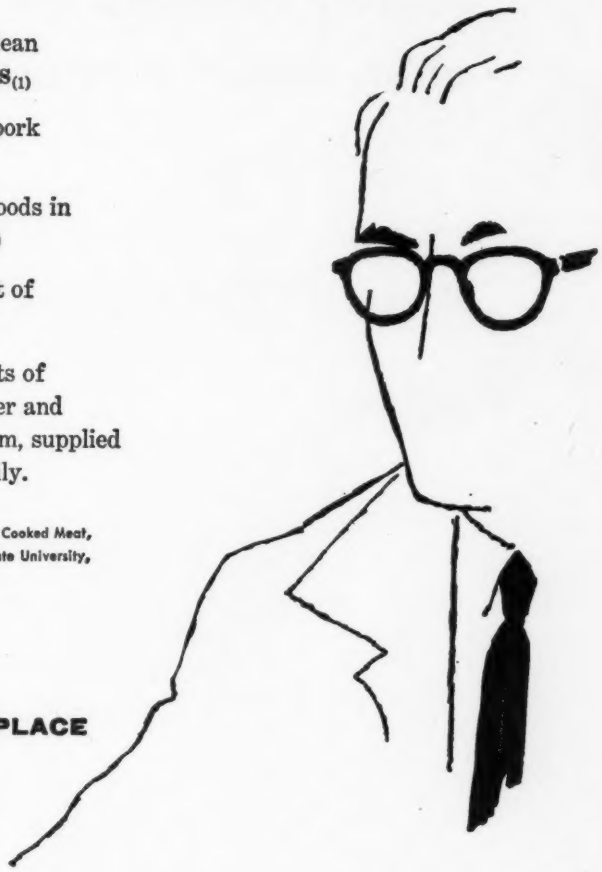

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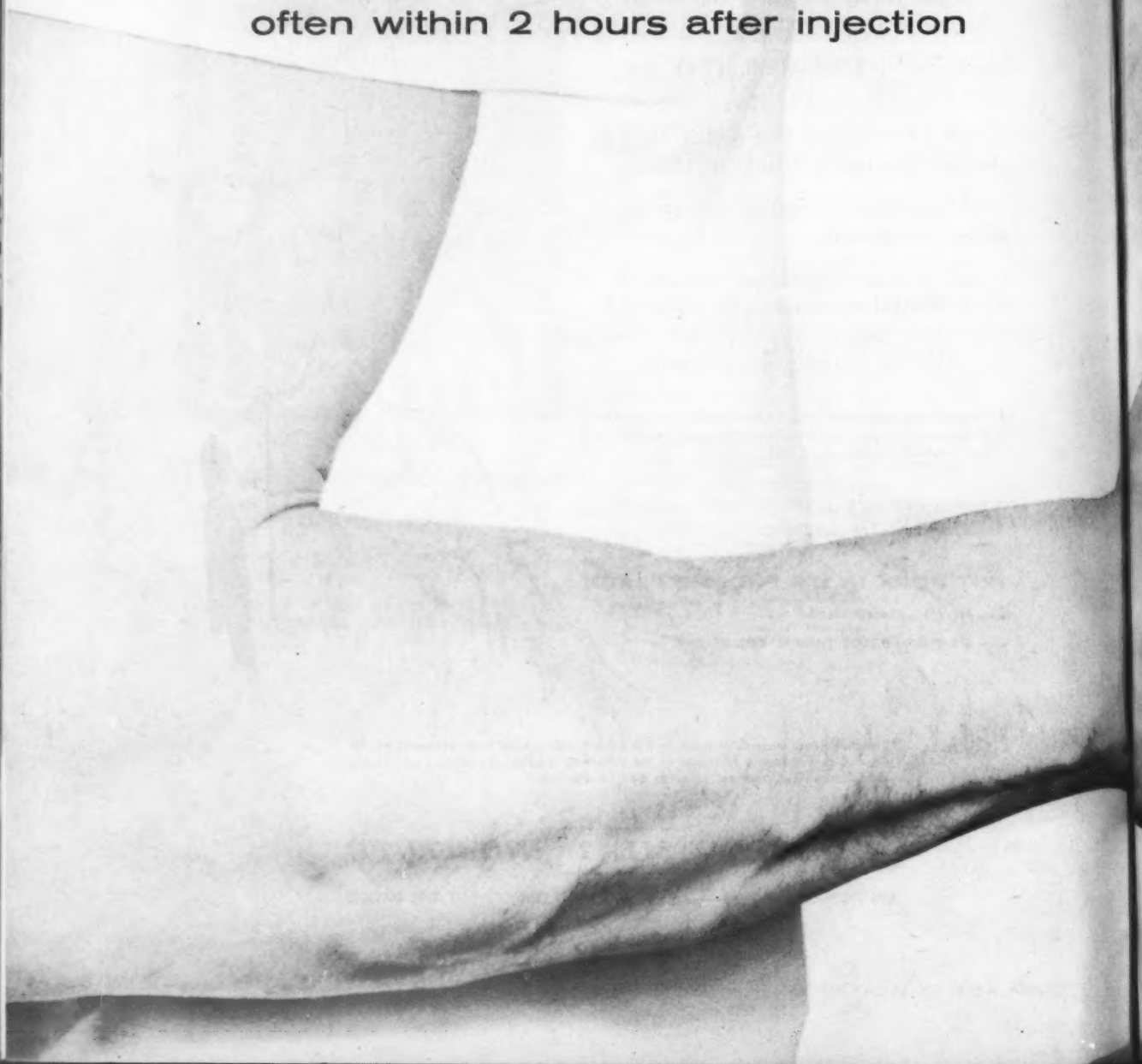

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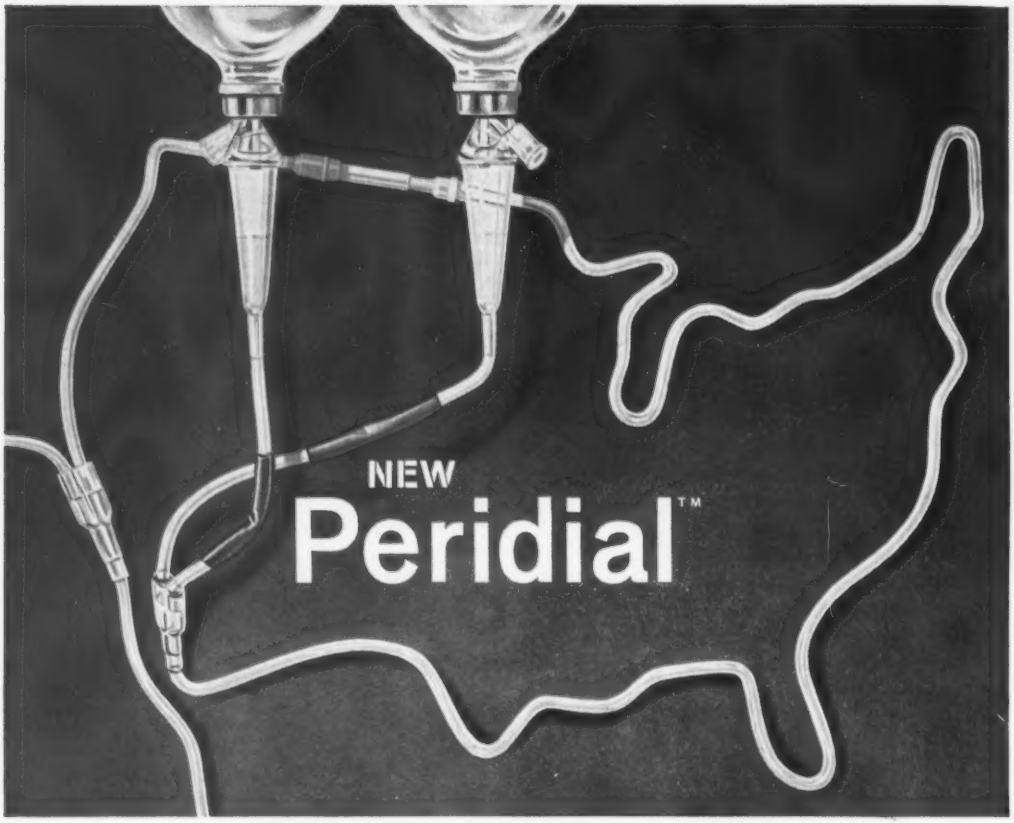

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†Maxwell, M. H., *et al.*: J.A.M.A. *170*:917, 1959.

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The cervical fascia: Its distribution and surgical importance*

LEONARD A. LEWIS, B.S., D.O., Grand Rapids, Michigan

The fascial planes of the cervical area are divided into two wrappings that completely envelop the visceral components of the neck. Basically, the fasciae are made up of connective tissue. They have various important functions, some of which are to protect, correct, support, and bind together the many muscles and viscera of the area.

Many of the products of metabolism are being found to play important parts in any consideration of the fasciae. The mucopolysaccharides and other biochemical products are being studied in this connection, and this work may prove that the fasciae are even more important than has previously been supposed.

The various processes that are carried out in a fascial component are not well understood and by most are not appreciated. Its value alone in the protection against disease is doubtless one of the most important factors in the successful conduct of surgery. Respect these tissues and use them properly, and they will return the favor. In order to follow this dictum, it is necessary to have an understanding of the distribution and relationships of the fascial planes.

The purpose of this paper is to correlate existing knowledge concerning the fasciae of the cervical area. There are descriptions of isolated areas of fascia of the neck; however, they are usually found in footnotes or only incidentally in connection with an area that is being locally described. This paper is an effort to treat them as a very important and useful structure, with an attempt to organize and to bring under one heading their importance.

*This paper was prepared and submitted to the Graduate School, Philadelphia College of Osteopathy, as part of the requirements for the degree Master of Science in Ophthalmology and Otorhinolaryngology, Philadelphia, May 12, 1959.

Anatomy

There are two layers, or two types, of cervical fascia. First is the superficial layer which lies immediately beneath the skin and external to the platysma muscle (Figs. 1 and 2). Directly beneath the platysma muscle lies the superficial layer of the deep cervical fascia. According to Barnhill,[1] "the superficial layer of the deep cervical fascia envelops everything in the neck except the platysma muscle and the skin." It encloses every structure from the skull above to the clavicle below like a tightly fitting, one-piece jacket. The deep layer of the deep cervical fascia itself is also included and enclosed by the superficial layer of the deep cervical fascia. The superficial fascia of the cervical area may be likened in shape to a tree trunk. Above, it has a circular cross section, while below, it has a more ovoid cross section. The fibers of this fascia flow in the longitudinal direction. This fascia splits into two complete sheets which enclose the sternocleidomastoid and trapezius muscles. Between these two muscles the fascia blend together to form a single layer with the anterior and posterior cervical triangles.

The attachments of this fascia are very important. In the posterior superior portion, it is attached in the midline to the external occipital protuberance, the nuchal ligament, and the spinous processes of the cervical vertebrae down to the seventh cervical. Coming forward from the posterior superior midline, it is attached to the superior nuchal line, the mastoid process, the inferior border of the mandible, and is continuous into the face as the parotid fascia. This fascia invests the parotid gland and goes on to the masseter muscles and attaches to the lower border of the zygomatic arch. The deep layer of the parotid blends with the fasciae of the posterior belly of the

Fig. 1. Superficial fascia, space of Burns, and incision at anterior border of sternocleidomastoid muscle.

digastric muscle and to the styloid process and styloid muscle, over the deep part of the gland, to the ramus of the mandible. Anteriorly and inferiorly, it goes to blend with the digastric and styloid hyoid muscles to the hyoid bone, and then it blends with the superior layer of the cervical fascia.

In the midline, anteriorly, it is attached to the symphysis of the mandible, then down to the body of the hyoid bone. From the hyoid bone, it is continuous in the midline with a superficial fascia of the opposite side. In the anterior inferior portion it attaches to the anterior and posterior surfaces of the manubrium sterni, to the medial one third of the clavicle, on to the acromion process and the spine of the scapula. It is continuous and blends with the pectoral and deltoid fasciae. In the anterior inferior midline these two layers that are attached to the anterior and posterior surface of the manubrium sterni extend up about 3 cm. between the inferior insertions of the sternocleidomastoid muscle, thus forming the suprasternal space or the space of Burns (Figs. 3 and 4). As has been previously stated, the superficial layer of the deep cervical fascia serves the simple purpose of enveloping everything in the neck as a whole, whereas the deep layer serves to wrap up and enclose each structure singly or in groups of two or three (Figs. 5 and 6).

The fascia directly under the sternocleidomastoid muscle encompasses the carotid artery, the internal jugular vein, and the vagus nerve, forming the carotid sheath. Superiorly this is attached to the basilar surface of the skull and surrounds the carotid and jugular orifices (Fig. 7). At the innermost part of this sheath, the two layers unite to pass more deeply and form the prevertebral fascia. This sheet of fascia forms the posterior compartment by interdigitating and fusing with the pretracheal fascia from the anterior portion of the neck. This space that has been made by the fusion of the prevertebral fascia and the pretracheal fascia is commonly known as the visceral compartment, which encloses such structures as the larynx, trachea, esophagus, thyroid gland, brachial plexus, and the subclavian artery.

The prevertebral fascia covers the longus colli and the scalenus muscles and the bodies of the cervical vertebrae and lies directly over the cervical plexus of nerves, thus forming the floor of the posterior triangle of the neck. Superiorly it is attached to the base of the skull in the basilar portion of the occipital bone and passes down in front of the vertebral bodies on into the thorax. Superiorly and medially, it is connected to the buccopharyngeal fascia. In a good percentage of cases, in the area of the sixth and seventh cervical vertebrae, the fascia that covers the scalenus minimus sends a process to the pleura cupula known as Sibson's fascia. This particular fascia helps to make the pleura tense in this area.

The pretracheal fascia begins also under the sternomastoid muscle and goes forward to meet in the

Fig. 2. Skin reflected; platysma muscle is seen.

midline; while doing so it encloses the omohyoid, sternohyoid, sternothyroid, and thyrohyoid muscles. This fascia is composed of two sheaths. The more superficial one encompasses the sternohyoid and omohyoid while the deeper and weaker of the two fasciae encompasses the thyroid, hyoid, and sternohyoid muscles. Superiorly, the pretracheal fascia is attached to the hyoid bone and is continuous above with the inferior constrictor muscle of the pharynx. Inferiorly, it is attached to the dorsal surface of the manubrium sterni with extension to the ventral portion, on to the left innominate vein and the pericardium. More laterally, this fascia is attached to the posterior surface of the clavicle and gives rise to fascia which extends to the fascia of the subclavius muscle and to fasciae which pass on each side of the subclavian vein to the first rib. This continues on to the lower margin of the scapular portion of the omohyoid muscle to the area of the clavipectoral fascia.

Fig 4. Anterior view of the neck, showing fascia in place on the left side. The space of Burns is seen from the anterior view. The right side shows the fascia reflected and the sternomastoid muscle cut to show the omohyoid muscle and the carotid sheath.

Fig. 3. Area exposed from the clavicle to the inferior border of the mandible, showing space of Burns, superficial fascia, platysma, and fascia blending with masseter muscle. Anterior border of the sternocleidomastoid muscle is visible.

The visceral fascia in the pharyngeal areas are considered to be a part also of the buccopharyngeal fascia (Fig. 8). This fascia covers the exterior of the constrictor muscles and continues with the fascia which covers the buccinator muscle. This is a very thin type of fascia. It is connected to the adjacent prevertebral fascia by loose areolar connective tissue and is considered to be the tissue which occupies the so-called retropharyngeal space. This fascia covers the constrictor muscles of the cervical area. In the area of the midline, where there is a free concave border, this fascia blends with the pharyngobasilar fascia; they meet near the base of the skull, thus forming in the posterior midline a fibrous band extending downward from the pharyngeal tubercle which aids in the strengthening of the constrictor muscle.

Lateral to this "absence of musculature," in the midline where the pharyngobasilar fascia comes in, is the so-called sinus of Morgagni. The pharyngobasilar fascia is attached to the basilar portion of the occipital bone, anteriorly to the pharyngeal tubercle and laterally to the spine of the sphenoid. It then goes to the apex of the petrous portion of the temporal bone and to the auditory tube and medial lamina of the pterygoid process. The pterygomandibular ligament extends to the end of the posterior (inaudible) end of the mylohyoid line of the mandible and then along the side of the tongue to the stylohyoid ligament, the hyoid bone, and the thyroid cartilage. Next in this area are the fasciae of the pterygoid muscles which come from the sheaths of the muscles directly to the basilar surface of the skull at the site of the muscular attachment. The pharynx is separated from the pterygoid region by a heavy fascial membrane known as the lateral pterygoid fascia, which extends from the pterygoid fossa to the prevertebral fascia. This fascia attaches along the line passing from the lateral margin of the carotid to the foramen ovale which is considered to be the upper attachment of the carotid sheath.

Fig. 5. View showing fascia going under the submaxillary gland, which is reflected, and the extensions anterior to the mandible and hyoid bone.

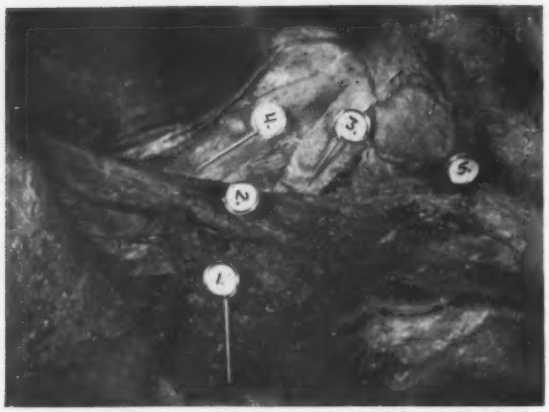

Fig. 6. (1) Platysma; (2) sternomastoid; (3) omohyoid; (4) sternohyoid; (5) fascia reflected from the submaxillary gland.

Surgical importance

Upon reviewing the anatomy of the cervical fasciae it becomes obvious that they extend to all parts of the neck. However, there is very little interest attached to the part lying behind the bodies of the vertebrae. To quote Barnhill[1]:

> The reason for this is that nearly all the diseases of the neck of an infectious and suppurative nature occur in the prevertebral structures, which comprise approximately the anterior one-fourth of the neck. Infective and suppurative diseases of the neck are nearly always secondary to primary foci in the head. The tissue of the neck with the exception of the gullet and trachea are sterile, and would remain so were it not that drainage from the teeth, tonsils, and nasal accessory sinuses is almost wholly into the prevertebral spaces of the deep cervical fascia. . . . Infections of the neck are almost wholly secondary to diseases of the sinuses, teeth and tonsils. Lymph or blood streams carry this infection wholly to the anterior regions of the neck and the structures of the neck which predispose to secondary development of infection and abscess.

When one considers the cervical fasciae and the muscles of the cervical area from the surgical point of view, he must remember that disease which simply involves these two systems is extremely rare. As a result, they owe their surgical importance to other reasons. Basically the surgical use of the muscles in the cervical area is that of being a reliable guide for operative procedures. However, there are many reasons why the cervical fasciae are important and they generally consist of the following:

1. They act as a wrapping for the various muscles and viscera of the area of involvement and securely and safely enclose these organs either as individual structures or groups and protect them against disease and mechanical damage.

2. The interval of space between these fascial planes is filled with connective tissue which enables the various nerves, lymphatics, and blood vessels to run.

3. These fascial planes, because of their longitudinal flow, allow for the transfer of pus into these spaces with a relative degree of ease without much resistance from the connective tissue between these planes. Therefore, if one is familiar with the locations of the loose connective tissues in these spaces, he will be able to properly locate the areas where pus is most likely to follow and collect. This will allow him to approach these areas and evacuate them with a relative degree of speed, safety, and certainty.

Fig. 8. Anterior compartment of visceral fascia.

4. These planes between the fascial sheaths themselves act as guides. When they are properly entered and followed the surgeon is able to reach the source of disease without entering dangerous zones of the neck.

5. The thickness and toughness of various areas of the cervical fascia must also be considered. In many areas, because of its thickness over a particular viscera, this fact will serve to guide the surgeon to where he expects infection to "point." For example, in the area of the parotid, this is very important surgically when there is an abscess of the parotid, as pus collections in this area meet great resistance in the outward direction because of the external thickness of the fascia (Fig. 9). However, it meets only slight resistance when it travels inward. As a result, generally speaking, for this reason a parotid gland abscess almost never breaks in an outward direction but usually ruptures in from the pharyngomaxillary space. Also, the fasciae surrounding this area which adjoin the deep fascia of the parotid are known to be much thicker, especially in the area of the hyoid bone, the angle of the jaw, and the superficial fascia of the parotid gland itself. Another ex-

Fig. 7. Carotid artery and bifurcation, along with the vagus and the jugular vein. Fascia is reflected from the parotid gland.

Fig. 9. Parotid fascia reflected, exposing the parotid gland.

ample of this is in the case of Ludwig's angina. Because of the fasciae, suppuration will be buried between the floor of the mouth and the infrahyoid region which is strongly attached to the hyoid bone. This will certainly occur in the area of the digastric, which is attached to the body of the hyoid and anteriorly to the genial tubercle on the inner surface of the mandible. Pus on the floor of the mouth can descend primarily only to the hyoid bone, then secondarily, to follow the posterior belly of the digastric back to the carotid sheath.

From the preceding review of the carotid sheath, which is embedded in loose connective tissue, it is easily understandable how readily this tissue can be separated from the surrounding tissues by pus under pressure, and, as a result, an abscess on the floor of the mouth may ultimately find its way along the digastric muscle and down along the carotid sheath deep into the neck. From the following it is obvious that the cervical fascia is by far the most important structure in the neck, from a surgical point of view, in aiding in early diagnosis and performing safe operations in this area. Also from the area formed by the different junctions of the fascial planes, which are usually filled with connective tissue and are easily separated by blunt dissection or by pressure of pus, it is usually found that the primary areas of the neck that will form these areas of involvement are (1) along the carotid sheath, (2) along the floor of the mouth, (3) in the mastoid notch, (4) deep between the parotid gland and submaxillary gland, and (5) in the prevertebral area. Generally speaking, the statistics show that "diffusion of suppuration of cervical processes tends to follow a predetermined anatomical path indicated by the architectural arrangement of the muscular and fascial planes of the neck."[1]

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I would like to acknowledge the guidance, instruction, and encouragement given to me by Dr. J. Ernest Leuzinger, Professor and Chairman of the Department of Otorhinolaryngology, Bronchoesophagology and Ophthalmology, and Dr. Angus G. Cathie, Professor and Chairman of Anatomy. For their advice and aid in photographing the cadaveric dissections of the cervical area, I would like to thank Robert Swain and Joseph Glickel.

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The "industrial back"*

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An "industrial back" is one that was injured "on the job." It is the same type of injury occasioned by furniture moving during spring house-cleaning, or sustained during a rear-end automobile collision.

Because of labor's pressure lobbying, all states have Industrial Accident Commissions which are supposed to protect an injured working man. Instead of protection, he is harried by repeated hearings, numerous examinations by insurance company and Commission doctors, and uncounted visits to his attorney, before he receives an award—which is paltry in comparison with his loss of income from loss of work. Much worse is the psychologic problem of a bad back which he will nurse for the rest of his life and which will follow him wherever he seeks employment.

To me, it is a paradox that even the poorest of the educated medical fraternity will treat a bad ankle sprain by restoration of anatomic alignment, and maintain that alignment with taping or casting to allow ligamentous healing. On the other hand, even the orthopedic specialist who is confronted with an injured back immediately after its onset, because he cannot see the edema at the apophysial joints, will proceed to apply 15 to 30 minutes of heat twice or three times weekly, use no support, and blithely tell the patient to be active but not necessarily work. How are those ligaments expected to heal when every attempt by nature to bridge the tear is disrupted by normal movement of the spine and trunk?

If our thinking were consistent, we would attempt to restore normal anatomic position to the injured spine and then immobilize it with taping, corset, or complete bed rest for 4 weeks; then the patient's body would have an opportunity to repair the ligamentous damage. It is true that this may not always be accomplished, as there may be intrapositional tissue between the torn ligamentous ends, but at least we have given nature a chance to perform this function.

After these evangelistic utterances, I shall return to the subject of the industrial back. Of course, a minutely careful history of the accident is important, including the date, time of day, the position of the patient and his actions at the time of the injury, and whether he reported it to his foreman or employer. It should also include the names of the doctors who treated him and the types of treatment administered. The initial pain—its severity, location, and time of onset in relation to the injury—as well as disability caused by the injury and progress of the complaint are of marked importance. Has it improved? Has the location changed? Has the character of the pain been affected by time or treatment? All of these are salient points to be elicited by careful questioning by the examining doctor. Previous history, including operations, previous industrial injuries, previous accidental injuries, and severe illnesses should not be overlooked in evaluating the patient. All these points are important in rendering a fair and unbiased report.

The doctor must use his powers of observation in these cases. How does the patient change position? How does he walk? How does he remove his clothing? How does he get on and off the examining table? These observations will give a greater insight into his condition than all the words that he uses in telling of his pain and distress.

After the patient is undressed, he is examined. Following is my own routine, but it is by no means the only satisfactory one:

I sit down behind the standing patient and examine his leg length. Are the legs equal? Note if he has any scoliosis. Examine for excess lordosis or kyphosis, abnormality of the levels of the gluteal folds, any atrophy of the gluteal musculature, varicose veins, varicose ulcers, flat feet, pronated ankles, or genu vulgus or varus of more than normal degree. All positive findings are noted on a history card. Forward bending is then performed by the patient. The distance between the floor and the fingertips in inches is noted on the chart. I also evaluate the

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lumbar flexion according to degrees. I note whether he is guarded in either forward bending or returning to the erect position, and if there is any compensatory motion in the hips.

The patient is then asked to hyperextend the spine and the degree that the dorsal and lumbar curves change is noted. Is pain associated with this motion?

Then left and right lateral bending are performed by the patient, and any difference in the arc of motion is noted.

All the preceding motions are carried out with the knees straight, and all, except lumbar flexion, with arms at the side and palms against the thighs.

The patient is then asked to get up on the examining table in a supine position, and then to raise himself up and reach toward his toes. We then test lumbar flexion and measure the distance of the fingertips from the toes. With the patient in a full supine position, the chin is flexed on the chest; and if pain is elicited, the area of pain is determined. Then Lesague's, Kernig's, and the Figure 4 tests are performed and the results noted. Achilles' reflex, knee jerk, and extension and flexion of the big toes are checked; Babinski reflex and dermatone sensitivity to pin prick are compared in both lower extremities. The circumference of the thigh is measured 4 inches above the upper pole of the patella in both extremities, and recorded. Similarly, a measurement is taken 4 inches below the lower pole of the patella on each leg and the results recorded. The patient is then told to turn to a prone position and watched as to the ease in turning over. Ely's test is performed. Paraspinal muscle spasm is determined by palpation and noted as to the levels of the spinous processes if it is found, as for example from L2 to S1 on the right. The spinous processes are palpated for tenderness. Finally, the thighs are raised and decreased joint mobility in the lower spine is noted.

The patient again returns to a supine position. I check the abdomen, noting any surgical scars, masses, and areas of tenderness. With the patient sitting on the side of the examining table, I check the blood pressure, pulse, heart, and lungs, and then examine the nasopharynx and teeth, of course noting any pathologic conditions encountered. On all male patients with low-back problems, the prostate is examined digitally; on female patients, a vaginal examination is performed if it seems indicated.

Roentgenographic studies are then performed; anteroposterior, lateral, and right and left oblique views are taken. After the films are studied it is time to make a diagnosis.

The most common finding is unstable lumbar or lumbosacral spine with ligamentous injury, with or without radiculitis. The second most common diagnosis is spondylolisthesis of the lumbosacral spine. Other findings are degeneration of the intervertebral disk with narrowing of the joint space; osteoarthritis; fractures of the bodies or spinous processes; and occasionally malingering. Sclerosis of the articular facets and occasionally a "kissing spine" are also noted.

The report that is made from all of the foregoing is the important document which will aid the patient, his attorney, and the insurance company or the Industrial Accident Commission in evaluating the man's disability. It behooves us, as osteopathic orthopedic men, to put forth our best efforts; by this report both you and your profession will be judged.

The report that is made . . . is the important document which will aid the patient, his attorney, and the insurance company or the Industrial Accident Commission in evaluating the man's disability. It behooves us to put forth our best efforts; by this report you and your profession are judged

The report should be a concise resume of the history, the findings, and your opinion as to the cause of the complaint, diagnosis, and relationship to the history of trauma. In addition to the clarity of the report, its completeness and its conveying of the doctor's mental picture of what he sees and what he finds in the way of working function and prognosis are important. A uniformity of terminology and standardization of the approach to reporting of permanent disabilities is required. For that reason, a reading of *Evaluation of Industrial Disability,* a book prepared by the Committee for Standardization of Joint Measurements in Industrial Injury Cases of the California Medical Association and the Industrial Accident Commission of the State of California,[1] is almost mandatory reading so that your report may be understood by the Commission referees, attorneys, claims adjusters, and other physicians.

Who sends the patient to your office is important. If it is the patient's attorney, he will be interested in the progress the patient has made with former physicians. Was the treatment correct? Was the diagnosis correct? Is the condition permanent and stationary? What future treatment, if any, would you advise? What is the prognosis of the case? Are there any restrictions on types of work or limitations on amount and weight in lifting? These facts will aid him in his presentation before the Commission referees.

When the patient is sent by insurance carriers for evaluation, they usually accompany the examination with all previous reports. What they primarily want is the diagnosis, recommendations as to workability, and prognosis. Some insurance company claims managers will prefer that you recommend continued treatment, but allow return to work; others will prefer no recommendations as to treatment, but the diagnosis and prognosis are all-important.

Many insurance companies will advise you to do an extensive laboratory work-up, so that some pathologic condition of blood or urine will give them an "out" on the case.

If the patient is referred to your office for an independent examiner's report, it is because the referee in the Industrial Accident Commission hearing has conflicting reports from both the employee's physicians and the insurance company's physicians, and he wishes an impartial opinion on the patient's condition. Fortunately, those referred by the Commission for examination are preceded by all the reports from all the physicians for you to evaluate before and after examining the claimant, as well as all x-ray evidence which has been submitted in the case. This, plus the examination, usually gives a very clear picture of the situation and helps greatly in arriving at an unbiased diagnosis and recommendation. It is very important that the report to the referee state whether the condition is or is not permanent and stationary at this time, since an award cannot be made until that plateau in the patient's recovery is reached.

In the State of California, ratings for disability are made by a special department of the Industrial Accident Commission, and a physician cannot report 25 per cent or total disability. Instead, he must convey a mental picture in his report as to loss of working function. As can be readily seen, 100 per cent loss of an arm may be only 50 per cent of total disability. The report of permanent disability findings should not be prepared until such time as the physician in charge of the case reaches the conclusion that it has reached a permanent stage or that no further improvement or retrogression is to be expected either from further surgical or physiotherapeutic measures.

Pain is a ratable disability if it interferes with work or handicaps the individual in performance of his usual occupational duties. Likewise, sensory changes, circulatory changes, and muscle weakness are important. These are often difficult to convey in a report, but the Commission relies on the doctor for an adequate picture of the disability caused by such factors. The character, degree, and the location or extent of the area involved should be carefully described, and where indicated there should also be included an opinion as to the functional handicap caused by such disability.

In back injuries, it is usually not limitations of motions which are the disabling factors, but pain, weakness, and inability to follow sustained activity. The location, character, and degree of pain should be described, as well as whether it is constant or intermittent and the circumstances under which it develops.

The examiner should express his estimate of any weakness and lack of endurance of spinal muscles, such as tiring on walking, and the degree of these if present. When the patient is wearing an artificial support, the fact should be mentioned, including the type of support or length of time since it was discarded. If the patient is not totally disabled, the kind or kinds of work which the examiner thinks the patient can do will be of assistance in evaluating the disability.

Many low-back patients are sent to me for evaluation by their attorneys, after they have been treated by various methods from physiotherapy to shots and pills, from manipulation to rest, and it is difficult to evaluate the patient. Many of these patients are vague in the nature of their complaints, and many of the physical signs are not too evident upon examination at this late date.

If there is any doubt in my mind that the patient may have cause for complaint, even though he was discharged as fit for work by the previous attending doctors, I will recommend a nonsurgical reduction and application of an antigravity cast. It is surprising and gratifying how many of these patients will come back and tell you that this is the first relief that they have had since their injury. What is more important, when they report this to the Industrial Accident Commission referee, he will naturally assume that you knew what was wrong with the patient. He will then give your report added weight and will more likely acquiesce to your recommendations and allow further treatment of the patient until the condition is stationary and permanent.

Naturally, this nonsurgical reduction and casting is an office procedure performed without anesthesia. It consists of the lumbar roll on both sides and then a springing forward of the pelvis while the patient is suspended in the air. Following this, a plaster of paris cast is applied in the usual manner for an antigravity cast. Many know this cast by the name "signet ring," because of its likeness to this object. The cast is allowed to remain on the patient for 4 weeks. I usually check the patient weekly. After removal of the cast, it is usually recommended that the patient obtain a P. C. Williams back brace, and here is where a problem often occurs. The moment an insurance claims manager hears the word "brace," he instinctively answers "No," because in his mind if the patient is provided with a brace, it is as if you had given the patient an artificial limb. "He will need to use the brace the rest of his life," is the thinking of the claims manager. Fortunately, this is not true. I try to explain that this is only to be used for 6

A conscientious, painstaking examination, an honest appraisal, and a definite regimen to follow provide the best answer for the "industrial back," which appears in your office for examination and treatment

months to a year, but usually to no avail. I have found it expedient to advise patients to obtain the brace themselves and make a claim before the referee for the cost of it. I also start them on exercises at home and allow them to return to work, seeing them about once monthly to assess the results. After 6 months to 1 year of wearing the brace, depending on their progress, I will discontinue use of the brace. If no trouble ensues, I will discharge them.

For patients who have recurrences of low-back problems despite the use of the brace, I recommend surgical fusion and include this recommendation in a supplemental report.

In summary, a conscientious, painstaking examination, an honest appraisal, and a definite regimen to follow provide the best answer for the "industrial back," which appears in your office for examination and treatment.

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Discussion

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Apparently Dr. Lyon believes that the term "industrial back" describes any acute lumbar sprain from lifting, pulling, or falling. This may well be. I do not question the frequency of acute lumbar sprain or acute lumbar strain with or without associated myositis, but I think that mention should be made of the herniated intervertebral disk as one of the problems that result from back injuries. The speaker alludes to the unstable lumbar or lumbosacral spine, with or without radiculitis. He also describes a competent neurologic component in his objective evaluation of the patient, yet he makes no mention of the most frequent cause of sensory or reflex change in the lower extremities under these circumstances.

A patient with a bilateral neuralgia or radiating ache does not necessarily have radiculitis. The discomfort is an extension of the pain process in the low back and not, as implied, an inflammatory change in the nerve roots. In my experience this transmission or radiation of low-back discomfort bilaterally or even only to one lower extremity differs markedly from the sharp, intense pain of radiculitis, plus the fact that there is no objective sensory change. If there is one-sided sciatica or femoral neuralgia, particularly if the extremity pain is alone or delayed in onset after the start of low-back pain, I hesitate to consider the diagnosis as lumbar sprain. This patient has a herniated fourth or fifth lumbar intervertebral disk until disproved. It must be remembered that a herniated fourth lumbar intervertebral disk with compression of the fifth lumbar nerve root frequently presents no reflex or sensory change. If Dr. Lyon is describing one form of low-back injury I will carry the debate no further, but if he implies with his title "The Industrial Back" that it is all-inclusive and the subject described is the typical injured workman, I then feel an issue must be made. No wonder these men nurse a bad back for the rest of their lives. They were never diagnosed correctly.

I also question the frequency of occurrence of the injury described as "torn ligamentous ends." Is this a minimal or maximal gross description of the ligaments, or is it rather a slight parting of the fibers which could only be perceived microscopically and revealed in gross form as edema and ecchymosis? The pathologic picture of "torn ligamentous ends with possible intrapositional tissue," is, I believe, entirely conjectural.

I would like to know what is being reduced? How is it being reduced? Why is it being reduced?

With acute lumbar sprain or acute lumbar strain rest is paramount and probably the only basic form of therapy. Regardless of how it is applied—complete bed rest, traction, brace, or cast—the main point is that the back musculature and ligamentous structures are placed at rest. I consider casting a means of protracted bed rest with the patient carrying the bed about with him. This is good treatment in my opinion. These patients are casted in extension on a Goldthwait frame or a modification thereof.

The subacute or chronic lumbar sprains are handled differently. I advise manipulation under anesthesia to break through the cycle set up by persistent osteopathic arthrodial lesions. This is then followed by casting for 4 to 6 weeks and subsequent return to full activity. The use of anesthesia in these patients has been found to be excellent in counteracting any iatrogenic increase in the symptom complex.

The examination and appraisal must be for the maximal advantage of a patient, not a client.

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Discussion

JAMES C. BOLIN, JR., D.O., Kansas City, Missouri

During these past 3 years while practicing in a large industrial area, I have encountered many problems such as Dr. Lyon discusses. To some extent I realize not only the physical trauma but also the psychologic trauma that a person with an industrial injury undergoes. It has been my experience that in too many cases there has been the problem of being for or against an insurance company with an occasional biased opinion rendered by the examiner for this reason. It is well known that compensation cases are special problems and as a rule they require a longer healing period. The percentage of disability in the final result is usually greater than in the average case. Contrariwise, some compensation cases may be hurriedly completed and granted as having a compensation neurosis.

When it is considered that the working man is in danger of being deprived of his livelihood, and relief for his disability appears to be remote, it is under-

standable that he could develop an anxiety neurosis. Instead of labeling him as neurotic, when it is understood that compensation is involved, one should think of the many patients he sees in private practice with identical complaints, who have no thought of compensation. Men in industry are usually rugged; the group should not be condemned for the faults of a few. The degree of complaint may depend upon the individual's threshold of pain. In compensation cases there usually is a cause for complaint; more frequently these symptoms are exaggerated. The patients want time to tell their story. Frequently they are referred to a physician they do not know. They want to talk with someone who understands them. They do not want to be misunderstood.

Industrial injuries to the back are definitely on the rise, and I believe that our mode of living may explain this somewhat. The average American drives to work in his automobile, walks a short distance, and works on a highly developed production line, on many occasions doing one specific type of work for the greatest part of his working day. Following his day's work, he gets back in his car, drives home, walks to the living room, sits down in a soft chair, and spends the evening watching television. This identical procedure is repeated day in and day out, with little thought to adequate exercise and keeping the muscles in proper tone and strength. When a sudden forceful activity is necessary, the back is not used to this and an injury develops. From there it develops into a compensation case, either with or without the help of an attorney.

It is true there are malingerers. However, in physical examination these situations can usually be found. I believe Dr. Lyon's method of examination is very thorough. We also must try to determine during the examination if there is malingering or hysteria. A malingerer is one who intentionally and falsely pretends, who exaggerates or conceals evidence of physical injury out of proportion to the actual disability that exists. Hysteria is a state of mind in which one actually believes himself to have a disease or physical disability from injury, which actually does not exist.

The physician is often called upon to distinguish between exaggeration and existing disease or injury. In industrial injuries, especially to the back, this is not an easy task. Examination where deception or exaggeration is suspected should be undertaken with a strictly impartial attitude on the part of the examiner. In order to gain his purpose, the malingerer must use subterfuge, and exaggeration is usually obvious no matter how cleverly it is performed. He usually exhibits slyness of expression and carefully watches the examiner in his various procedures. He may often try to impress the examiner with the importance of his case, and frequently states what an honest person he is. Of course his primary complaint is pain, which is subjective and cannot be felt or observed by the examiner. Pain can be verified, and the extent and intensity of pain may be evaluated through tests and observations carefully planned and executed through a physical examination. Pretended pain can be detected only by thorough examination. The absence of pain can be proved by tests, which confuse the patient to the extent that he will make false complaints and signs that do not correspond to clinical examination. A person who is actually in pain will usually show a definite degree of faintness, pallor, or changes in facial expression.

In back disabilities one may attempt to prove that the point of tenderness is not constant. One way is to apply pressure at the painful point and mark it, distract attention by examining some other part of the body, and press on the tender area. Or, after marking the point, finish other examination procedures and come back and again ask the position of the tender point. If it is not closer than 2 inches from the marked area, exaggeration is suspected. Another way is to suggest a certain point and mark it. Later suggest a nearby point and note whether the pain shifts with suggestion. A fourth way is to move or ask the patient to move the part in resistance to a muscle group that is nearby, but in no wise associated with the muscle group or related joint of the affected area. If he complains of pain in the muscle group or related joint which corresponds to the allegedly painful region, judge inaccuracy of statements and correlated reactions. This is best done by using a flexor group, where an extensor group may produce pain in the joint or the ligament allegedly painful. Five, where the same muscle serves more than one movement, as for instance the latissimus dorsi muscle, it may appear to be painful when standing or an effort to lift, yet contractions of the same muscle in the act of pushing downward and backward may cause no complaint. Six, diminution of muscular response is noted for atrophy and even prominent inflammation.

With careful direct and indirect methods, malingering and exaggeration of symptoms can usually be verified, and this is extremely important in the evaluation of the "industrial back." In my own practice, strain has been the most common finding. In the traumatic sense it is a minor injury undergoing rapid repair, if uncomplicated. However, unfortunately, as Dr. Lyon mentioned, the treatment given to many of these patients is 15 to 30 minutes of heat, with no support, and traumatic strain develops into a chronic strain. This becomes a chronic pathologic state in which the tissues are hyperplastic and resistant, or one in which there is fibrocytis of inflammatory origin. Chronic strain could be eliminated in many cases if adequate care during the initial injury were instigated as outlined by Dr. Lyon. The second most common injury that I have found has been a sprain brought about by a sudden twisting or wrenching, twisting the ligaments until they become sore or separated from their attachment.

In a sprain there is an immediate disability, and the symptoms are more severe than in the case of strain. There is severe suffering accompanied with nausea and faintness. The injury may be severe, falling slightly short of fracture or dislocation. Deep muscle rigidity occurs promptly, and there is a definite localized area of deep sensitivity and tenderness. To prevent disability adequate care must be given these patients.

I cannot agree with Dr. Lyon on his diagnosis of spondylolisthesis in regard to industrial injury. I believe this to be a pre-existing condition, unrelated to industrial injury. The prevalent concept of the causation of symptoms of spondylolisthesis is a defect in the pars intra-articularis of the fifth lumbar vertebra, and there is usually instability in that area upon the sacrum, and a consequent tendency to progressive forward slipping. Many patients in the third, fourth, or fifth decade of life, with no previous back symptoms, may develop back diffculty without injury or only trivial injury, and the roentgenograms reveal a first or second degree spondylolisthesis. Frequently roentgenograms taken for other conditions reveal a second or third degree spondylolisthesis, although the patient has no history of back or leg pain. Many patients with so-called unstable backs have been able to work for many years at the hardest kind of physical activity, until suddenly something starts the train of symptoms. In a large series by Friberg,[1] there was found no correlation between the degree of the forward displacement and the degree of the symptoms. It appears that progressive displacement may occur, but only in childhood; immediate displacement will occur rarely in adults as a result of severe injury, from fracture to the transverse process and articulations and tearing of the annulus. If the symptoms were caused by displacement alone, pain should be most marked during early childhood, which is not the case. Surgical exploration of these cases has revealed that the symptoms of spondylolisthesis are not caused by instability of the body but by nerve root compression and irritation. It is my opinion that spondylolisthesis is a pre-existing condition and not the result of an injury, the condition being found during routine x-rays following a back injury.

In evaluating the "industrial back," I believe it is important to realize fully the mechanism of the intervertebral disk. I have found a surprising number of industrial cases diagnosed as sprain, neuritis, sciatica, and so forth, who on examination by previous doctors exhibited no neurologic findings relative to nerve root pressure. However, it must be borne in mind that it is possible to have an extruded or bulging intravertebral disk with no neurologic findings. In a series of 400 cases studied, I could find very little relationship to narrowing of the intervertebral space or disk disorder. Frequent and repeated neurologic examination should be made on all patients under observation, because neuroligic changes may be transient and their character overlooked. It has been my finding that the usual areas of sensory loss with single root involvement are rather small and do not follow the usual anatomic charts. If straight leg raising causes traction on the fifth lumbar or first sacral root, it is continued often to accentuate the neurologic findings that these roots are involved. The principle is to utilize the test in which the patient sits on the table with legs fully extended and then stretches down with his fingers toward his toes for a period of 4 or 5 minutes. During and immediately following this test the power and extension in the great toe and the sensation of the foot are tested.

The patient then sits up quickly, with his legs over the table, and the reflexes are examined. The hyperextension is performed with the patient sitting on a stool beside the table, and his back hyperextended across the table for 4 to 5 minutes. The reflexes, sensation, and motor power are tested repeatedly. In some disk cases, this brings out neurologic findings. Both tests are invaluable since many patients will show no positive findings until they are performed. If sufficient time for healing has elapsed or if the patient has been adequately taken care of and symptoms still persist, many times I am in favor of a diagnostic myelography. If this is negative, a discogram is performed, regardless of whether neurologic findings are present or absent. Frequently the previously judged neurotic or malingerer will be found to have disk disease by using this approach.

I especially like Dr. Lyon's recommendation of using an antigravity cast. It has been my experience that great benefit can be derived from the application of this cast. I am in complete agreement with his long trial periods of conservative treatment on these cases. I have found that by using this formula the patient can be benefited both psychologically and medically, and in most cases he will be able to return to his original occupation.

In closing I can only re-emphasize the importance of careful history, thorough physical examination, and adequate treatment in the industrial back.

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Twin pregnancy and delivery
Review of the literature and analysis of 188 consecutive twin pregnancies*

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Multiple pregnancy is, perhaps unnecessarily, predominant among those conditions which are known to contribute to fetal loss. It is the purpose of this paper to review the causes of this aspect of fetal wastage and elucidate the relationship of controllable factors in twin delivery to twin survival. A group of 188 consecutive twin pregnancies will be analyzed in this connection. We shall also attempt to examine factors which enhance the perils to which twins are prone, with special reference to the proper interval-delay between the delivery of the first and second twin, a point upon which no universal agreement exists.

There is only one real point of agreement concerning twin deliveries: infant losses occur more frequently when there are twins than when there are single births.[1]

Review of literature

Fetal loss • Kurtz, Keating, and Loftus[2] of the Margaret Hague Maternity Hospital state that the greatest single factor in fetal loss in twin deliveries is prematurity, immaturity, or a combination of both. Twin pregnancy is itself one of the more common causes of prematurity. Yet it remains undiagnosed before delivery in about half of the cases. Stone and Donnenfeld[3] report toxemia as a frequent complication of multiple pregnancy. This is substantiated by the findings of Allen,[1] and those of Little and Friedman[4] of the Sloane Hospital for Women. Munnel and Taylor,[5] in their analysis of multiple pregnancies, found greater than expected frequencies of polyhydramnios, placenta previa, abruptio placentae, cord prolapse, uterine inertia, and fetal distress. Nesbitt[6] added prolonged anesthesia, uterine contraction ring, and intrauterine manipulation.

With reference to the relative difference in mortality rates between the first and second twin, comparative studies are divided in opinion but most investigators believe that death occurs more frequently in the second-born. Anderson,[7] in an analysis of 397 twin pregnancies, noted that nine out of ten stillbirths due to hazards of birth occurred in twin B. Contradictory views were expressed by Potter and Crunden,[8] Potter and Fuller,[9] and Donnelly.[10] The last reported that mortality for second twins was not significantly greater than for first twins. She did, however, note a significantly greater death rate for second twins weighing 1,001 to 2,500 grams.

Little and Friedman,[1] to clarify the disparity, tabulated data from the literature covering a period from 1956 to the end of 1959. Their work definitely supported the contention that mortality is greater in twin B. A study of multiple pregnancies from a period of 1947 to 1957 also substantiates this.[4]

Kurtz, Davis, and Loftus[11] also found in their study of triplets that the second- and third-born babies suffered a perinatal loss two and one half times greater than the first-born, which corresponds with the greater birth hazard of the second twin.

Carston,[12] in a study of 211 consecutive cases at Grace Maternity Hospital in Halifax, reported that twice as many second twins as first twins perished. Of the 211 cases, 15 first twins were adversely affected as follows:

Four stillbirths

Four neonatal deaths (two cases of prematurity, one of congenital heart disease, and one unexplained)

Four infants resuscitated and lived

Two infants lived, but left the hospital with some residual spasticity

One left the hospital with a cephalic deformity.

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Thirty-eight second twins were adversely affected:

Nine stillbirths
Six neonatal deaths (two prematurity, two subarachnoid hemorrhage, and two unexplained)
Twenty-three resuscitated (twenty lived and three died in the first week).

Anoxia • There is evidence that anoxia occurs more frequently in twin B. Hingson and Hellman,[13] in an analysis of breathing and crying times in twins, demonstrated significantly prolonged reaction times in second twins. Carston's[12] breakdown shows that four times as many second twins had to be resuscitated as first twins. Factors which may explain this discrepancy are few. One such factor may be the less favorable position of the second twin in the uterus during labor, rendering it more liable to direct trauma from the contracting uterus. Another possible factor is the reduction of uterine capacity following delivery of the first twin, which may alter blood flow in the placenta and cause anoxia in the baby remaining in utero. This in turn may be aggravated by the cumulative effect of prolonged anesthesia.

Early diagnosis • One main alterable factor is early antepartum diagnosis of multiple pregnancy. As was mentioned earlier, many studies reveal that over half of multiple pregnancies are not diagnosed prior to hospitalization for delivery. The condition should be suspected if the uterus is unduly enlarged for the period of gestation. On palpation, the most reliable evidence is the finding of three fetal poles: two vertices and a breech, or two breeches and a vertex. Roentgenography may prove conclusive. A method now being used in diagnosis is electrocardiographic study; it has been shown that the fetal electrocardiogram becomes large and clear rather suddenly at 19 to 21 weeks of pregnancy. It provides a means for estimating the presentation of each fetus with great accuracy, as well as for the number of fetuses in utero.

Methods of delivery • The literature is contradictory with reference to a preferable method of delivery for twin B. Some suggest spontaneous delivery of the first twin wherever possible followed by the immediate rupture of the membranes of twin B and manipulation to a longitudinal presentation. Eastman[14] states that following the rupture of the second sac, one should attempt by combined abdominal and vaginal manipulation to adjust the fetus into a longitudinal presentation, either vertex or breech. If successful, pressure on the fundus will engage the presenting part and rapidly propel it down through the birth canal which has been so recently dilated. Pressure is continued until either spontaneous delivery of the second twin eventuates, or an easy forceps or breech extraction is carried out. If it is impossible to manipulate the second fetus into a longitudinal position, or if pressure does not engage it in the pelvis, version and extraction should then be carried out on the second twin.

Carston,[12] on the other hand, assails classic textbook authors for their "laissez faire" attitude—ascertaining a longitudinal lie of the second twin and doing little or nothing more to aid in its delivery. He claims that this has probably been the cause of death in the second twin in many instances. Munnell and Taylor[5] noted that operative delivery was accompanied by higher fetal death rate in the second twin. Hawker and Allen[15] reported a 19 per cent corrected mortality for forceps delivery. Their mortality for forceps delivery was five times as great as for version and extraction.

There was no apparent increase in death rate of babies delivered by podalic version and extraction in several reported series. Bender and his associates[16] advocated version and extraction whenever there is any delay in delivery of the second twin. Hofmeister and Paegel[17] report that version and extraction carried a higher infant mortality rate than any other type of delivery, with high forceps second. Lull and Kimbrough[18] state that the use of podalic version and extraction is justified only on the basis of malpresentation, prolapse of the cord, and premature separation of the placenta. Kurtz, Davis, and Loftus[11] feel that internal podalic version has proved to be completely unsatisfactory, and they suggest its use should be abandoned.

Data published by Little and Friedman[4] showed that poorer diagnosis for twin B was noted in all delivery forms. It must not be forgotten, however, that the weight factor is rather influential. For large babies, all methods of delivery appear equally safe for twin B, with the exception of midforceps. For smaller babies the hazards of breech delivery seem to mount rapidly. The added risk of podalic version on very small infants seems to contribute toward increased second twin losses. Hazards of version and breech extraction are minimized in larger infants.

Interval-delay between deliveries • Davis and Stevenson[19] report a wide difference of opinion as to how long a period may be permitted to elapse between the birth of the first and second twins. There are reports of cases where many hours, even days, have elapsed. In general, it is believed best to interfere if more than a half hour passes without definite progress for, while the mother may not be affected, there is risk that retraction of the cervix may further delay the labor.

Eastman[14] says that in this day of modern obstetrics, when the use of anesthesia is routine, it is impractical to wait for any length of time between the delivery of the two fetuses; therefore, delivery of the second twin follows within a few minutes the birth of the first. All authors agree that evidences of fetal distress or maternal complications necessitate immediate delivery of the second twin.

Various opinions have been offered regarding the preferable time interval for best fetal salvage. Beck[20] advised artificial rupture of the membranes after 20 minutes and said that it was a mistake to delay interference more than 1 hour. Other workers[21,22] recommend that an interval be allowed to permit the uterine muscle to contract, reducing the size of the cavity in order to make contractions more effective. Greenhill[23] felt that one should not wait longer than

1 hour. Munnell and Taylor[5] felt that since after 20 minutes most second twins were delivered by operative procedures, it is not advantageous to wait longer. Nesbitt[6] felt that there should be little delay between the births of the first and second twins. If the vertex did not enter the pelvis within 5 minutes after delivery of the first twin, version and extraction was preferable to further delay in most instances.

Carston[12] added that risk to the second twin could be diminished by avoiding delay in delivery between the first and second twins. He states that the maximum time interval should not exceed 15 minutes. Aided delivery of the second twin does not seem to affect the chances of survival; in fact, assisting the birth of the second twin and thereby decreasing the time interval may well protect the baby from intrapartum death due to anoxia.

According to Lull and Kimbrough,[18] in the majority of cases if nothing is done to effect delivery of the second twin, cessation of labor occurs for ½ hour or more. Delay in delivery of the second twin is not justified because of the risk to the baby from the possible occurrence of malpresentation, prolapse of the cord, or premature separation of the placenta. They further state that one should not wait for spontaneous delivery nor for any specified period to elapse before delivering the second baby. As soon as the first baby is attended to, the patient is examined to determine the presentation of the second twin. In their study, in only a few cases was the second twin delivered longer than 10 minutes after the birth of the first twin, and in over half the cases the second twin was delivered in less than 5 minutes. Hawker and Allen[15] also advocate delivery of the second twin within 15 minutes of delivery of the first.

In the study by Little and Friedman[4] of the perinatal mortality of the second twin by interval-delay, by interval-delay and infant weight, and by interval-delay and method of delivery, the following was demonstrated: The median time range (2.5 to 14.9 minutes) is emphasized as the period of low mortality, probably representing "middle of the road" management, involving neither excessive haste nor unnecessary delay. Spontaneous deliveries appear safest between 10 and 25 minutes, and this time interval seems to be reflected as the safest in all other forms of delivery. It is of interest to note that perinatal deaths in the breech extraction and version-extraction groups became concentrated among second twins delivered within 5 minutes and after delays greater than 25 minutes. One may conclude that version-extractions done with undue haste are exceedingly hazardous to second twins. When there are prolonged delays before the birth of twin B, high mortality rates appear to be the rule regardless of the method of delivery.

Stone and Donnenfeld,[3] in a study of 192 consecutive pregnancies, also concluded that the interval between delivery of the first and second twin is apparently a significant factor in the twin's survival, particularly for smaller babies.

Kurtz, Davis, and Loftus,[11] in their triplet study, report that if the interval between delivery of the first and second born was less than 5 minutes, they had a 28.6 per cent mortality for the second baby. If the time was more than 5 minutes, the mortality rate rose to 60 per cent. They claim that successive deliveries should be effected as soon as possible, and if necessary, uterine contractions should be stimulated by Pitocin infusion.

Present study

General statistics • The incidence of twins at Detroit Osteopathic Hospital from January 1, 1955, through December 31, 1959, was 188 cases in 21,133 pregnancies, or 1 in 112 cases, or 0.89 per cent. The average age of the mothers was 27.6 years; the youngest at time of delivery was 17, the oldest 40. Of the total number, 101 (53.7 per cent) were under the average age and 87 (46.3 per cent) were over this age. This does not agree with others' general experiences; for example, the figures reported from the Margaret Hague Hospital[2] showed 40.2 per cent of the mothers to be under age 30 and 71.8 per cent were multiparas. Total fetal loss in both first and second twins was greater in mothers under the average age than those over. Primiparas fared no worse than multiparas. Of the 188 mothers, 29 (15.4 per cent) were primiparas, 136 (72.4 per cent) were multiparas, and 23 (12.2 per cent) were grand multiparas. Excluding elective cesarean sections but including those sections which were performed after the patient had been in labor, the average length of the first stage of labor was 4 hours and 53 minutes. The average length of labor for primiparas was 10 hours and 9 minutes, while the average for multiparas was 3 hours and 46 minutes. The length of labor did not show any particular pattern so far as mortality were concerned. The outcome of fetuses in this series is shown in Table I. There were 34 deaths among 376 infants, or 9.04 per cent, corrected to 7.74 per cent.

TABLE I—FETAL OUTCOME

	Living	Neonatal deaths	Stillbirths
First twins	176	8	4
Second twins	166	21	1

Maturity • The average gestational age of the mothers in this study was 36.8 weeks. The earliest was 24.5 weeks and the longest 42.5 weeks. Fifty-nine (31.9 per cent) were at a gestational age under the 36.8 weeks while 129 (68.1 per cent) were over. These figures compare favorably with other studies even though 54 per cent of the mothers were undiagnosed for multiple pregnancy before admittance. The great bulk of fetal loss was in the group under a 36.8 week gestational age. Maturity according to weight was even less frequent than maturity by gestational age: 102 first twins (54 per cent) and 102 second twins (54 per cent) weighed less than 2,500 grams. All but two of the twins who died belonged to those premature groups. The lower the weight, the sharper

the increase in percentage of mortality. Of the 188 first twins, 94 (50 per cent) were considered premature, 8 (4.0 per cent)were considered immature, and 86 (46.0 per cent) were considered mature. Coincidentally, the figures were exactly the same for second twins. The average weight of first twins was 2,500 grams, and the average weight of second twins was 2,363 grams. The heaviest twin weighed 3,690; the lightest, 865 grams. The difference in weight in a set of twins, even when great, appeared to have no appreciable effect on salvage. According to Kurtz[2] this implies that intrauterine age or maturity is the determining factor in survival rather than birth weight.

In a comparison of premature singlets by Kurtz,[2] it was found that more first and fewer second twins survive than single prematures. This corresponds with the fact that twins of given gestational age tend to weigh less than single infants of the same age, and that some mature twin babies are under the arbitrary limit of 2,500 grams.

Sex • Of the first-born children, 50 per cent were males, and of the second-born, 46.8 per cent were males. Combinations of sex among the twins were as follows: Both female, 69 (36.8 per cent); both male, 63 (33.5 per cent); twin A male and twin B female, 32 (17.0 per cent), and twin A female and twin B male, 24 (12.7 per cent). In 132 pregnancies (70.3 per cent), both babies were of the same sex, and in 56 (29.7 per cent) they were of different sex. Thirteen male first twins were lost versus 1 female, and 14 male second twins against 6 female second twins, demonstrating greater vitality among the girls in both first and second twins.

Presentation • At the time of delivery, 149 of the first twins (79.3 per cent) were vertex presentations, 33 (17.6 per cent) were breech of some type, and the remaining 6 (3.1 per cent) were of some other type, including 3 transverse lies, 1 compound presentation, and 1 brow presentation. The second twin group contained 93 (49.5 per cent) breech presentations, 66 (35.1 per cent) vertex presentations, 22 (11.7 per cent) transverse lies, and 7 others including 5 prolapsed arms, 1 brow, and 1 compound presentation.

Of the vertex presentations 10 first and 10 second twins were lost. Two first breeches were lost, as compared with 11 second breeches. On a percentile basis there is an expected poorer prognosis, according to Kurtz and others,[2] for a twin presenting by other than vertex. Our statistics bear this out for the second twin but not for the first. Kurtz and his coworkers also feel that adverse presentations play a small part in the poorer salvage that is found in second twins. Combinations of presentations are shown in Table II, and methods of delivery in Table III.

On twin A, the highest mortality occurred among those delivering spontaneously and by outlet forceps. However, it must be added that on two of the infants delivered by outlet forceps, autopsy subsequently revealed that congenital anomalies actually caused their death. Therefore, the incidence was much lower than with low midforceps or cesarean section.

On twin B, total breech extraction, internal podalic version, and spontaneous deliveries accounted for almost all of the mortalities.

TABLE II—COMBINATIONS OF TWIN PRESENTATIONS

Twin *A*	Twin *B*	No. cases	Percentage
Vertex	Breech	66	35.5%
Vertex	Vertex	61	32.4%
Vertex	Transverse lie	17	9.0%
Breech	Breech	16	8.5%
Breech	Vertex	10	5.3%
Breech	Transverse lie	6	3.2%
Transverse lie	Breech	3	1.6%
Vertex	Compound	2	1.0%
Brow	Breech	2	1.0%
Breech	Brow	1	0.5%
Transverse lie	Vertex	1	0.5%
Compound	Vertex	1	0.5%
Breech	Prolapsed arm	1	0.5%
Vertex	Prolapsed arm	1	0.5%

TABLE III—METHODS OF DELIVERY

Method	No. cases	Percentage
Twin A		
Outlet forceps	90	47.5%
Breech extraction	33	17.6%
Spontaneous	25	13.5%
Low forceps	15	8.1%
Cesarean section	14	7.4%
Midforceps	10	5.4%
Podalic version and breech extraction	1	0.5%
Twin B		
Total breech extraction	88	46.8%
Internal podalic version and breech extraction	34	18.1%
Midforceps	17	9.0%
Outlet forceps	17	9.0%
Cesarean section	14	7.4%
Spontaneous	10	5.4%
High forceps	5	2.7%
Low forceps	3	1.6%

Interval between deliveries • Kurtz, Keating, and Loftus[2] found the optimum time for delivery appeared to be between 6 and 10 minutes for babies over 1,500 grams. As time intervals between deliveries of twin A and twin B went below 6 minutes or above 10 minutes, the mortality rate rose sharply. In our study, of 22 twin B deaths, 11 were recorded as being delivered in less than a 3-minute interval and 2 were delivered over the 10-minute interval. The average delivery time interval in our study was 6.5 minutes. The shortest interval was 1 minute; the longest 35 minutes. Of the 188 twin pregnancies, 96 second twins were delivered within an interval of less than 6 minutes, 72 were delivered in 6 to 10 minutes, and 20 were delivered within an interval greater than 10 minutes. The highest mortality rate was found in the group delivered in less than 6 minutes.

Oxytocics were administered in 23 cases. Eight patients received a 1:8000 Pitocin solution in 1000 cc. of 5 per cent dextrose in water before the first twin was delivered, and 15 received it after delivery of the first twin. There were no deleterious effects noted.

Anesthesia • Conduction anesthesia—caudal, epidural, saddle block, or spinal, was used in 172 cases (91.5 per cent). Sixteen patients (8.5 per cent) received inhalation anesthesia either before or after the first twin was delivered. Although more mortalities were associated with the former, when other factors such as prematurity and congenital anomalies were correlated, there was no difference in survival rate.

Complications • Of the 188 mothers, 23 had complications. The most common complication was toxemia of pregnancy which occurred in 10 cases (5.3 per cent). There were 2 cases of placenta previa, 1 of abruptio placentae, 3 cases of polyhydramnios, 1 Bandl's constriction ring, 6 cases of prolapsed cord, and 1 case of severe anemia. There were two infant deaths associated with 1 case of placenta previa centralis at 34 weeks' gestation, 1 death with a toxic patient at 37 weeks' gestation, 2 with 2 cases of prolapsed cords, 2 at 33 and 30 weeks' gestation, respectively, and 2 with 1 case of polyhydramnios, although these infants were classified as immature. There were no maternal deaths in our series.

Discussion

From the foregoing, it is clear that the greatest contributory factors responsible for fetal loss in twin deliveries are prematurity, immaturity, or a combination of both. Twin pregnancy is itself one of the more common causes of prematurity, yet it remains undiagnosed in over 50 per cent of cases.

It is obvious that about half of twin pregnancies do not receive the best possible prenatal care for lack of an early diagnosis. Effort should be directed toward early diagnosis and a rational regimen intended to reduce the incidence of premature labor in twin pregnancy.

Prematurity alone fails to explain why twice as many second as first twins are lost. Additional factors must be operative to explain this discrepancy. Perhaps one factor is the less favorable position of the second twin during labor, since he occupies the active uterine segment and is rendered more liable to direct trauma from the contracting uterus. This is especially true in the case of premature twins. Another mechanical factor is the greater incidence of operative interference for the delivery of the second twin. A third factor is the time elapsing between delivery of the twins. A possible factor is the reduction in uterine capacity which follows delivery of the first twin, which may alter the hemodynamics of the placenta and cause anoxia of a variable degree in the second twin. Kurtz and his coworkers[2] add the interesting note that version-extraction is a procedure rapidly going out of vogue because of the high incidence of fetal mortality associated with the procedure.

From this study we offer the following suggestions for twin pregnancy management: Primarily, an early diagnosis of twinning should be looked for. Once diagnosed, the mother should be urged to much rest, complete bed rest if at all possible, for the latter 4 to 8 weeks of her gestation. Following delivery of the first twin, the presentation of the second should be determined. Then the membranes are ruptured. Without removing the hand, an attempt at positioning, even though it may necessitate podalic version, should be done. Delivery then is accomplished without delay. It is noteworthy that at our hospital anesthesiologists are present at all deliveries and are immediately available for resuscitation.

Summary

A series of 188 consecutive twin pregnancies and deliveries has been analyzed, and literature on the subject reviewed.

The main cases of fetal wastage in twin deliveries are prematurity and immaturity and an increased liability of the premature twin to birth trauma and anoxia. The birth hazard for the second twin is greater than for the first twin. Weight difference between the first and second twins does not seem to add to the birth hazard for either twin.

Results may be improved by (1) early diagnosis and better prenatal care, (2) elimination of unnecessary operative interference, and (3) reduction of the interval between the delivery of the twins, particularly in cases where small babies are involved.

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Diarrheas: Acute and chronic*

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Diarrhea is an increase in looseness or fluidity of the stool. In addition, the number of stools is usually, but not necessarily, increased.[1] It is a symptom of numerous disorders which when taken together constitute one of the important problems in the pediatric age range. A useful classification would seem to be that utilized by Paterson and McCreary.[2]

1. Infection
   - A. Enteral
     - a. Bacterial: staphylococcus, colon, and paracolon group
     - b. Viral
   - B. Parenteral
     - Septicemia, pneumonia, and peritonitis
2. Improper foods
   - A. Allergenic foods
   - B. Excessive fats
   - C. Unripe fruits and vegetables
3. Improper feeding: excessive intake
4. Metabolic disorders
   - A. Celiac syndrome
   - B. Hyperthyroidism
   - C. Uremia
   - D. Acidosis
5. Medicines
   - A. Laxatives
   - B. Antibiotics

Infecting organisms

The diagnosis of diarrhea can be exceedingly difficult. In a minority of instances the cause of acute diarrhea may not be determined. The disorder has been attributed to practically every organism found in the stool, and viral agents are usually spoken of as the cause when only so-called normal flora are found. Only when known pathogenic agents are recovered is it possible to know what has actually been the pathogen.[3]

Nelson[4] recommends that from an epidemiologic viewpoint an approach can be made on the basis of age group, that is, the newborn period, infancy, and childhood. In the newborn period the primary concern is the epidemic in the nursery, and it is due mainly to the known intestinal pathogens, the pathogenic Escherichia coli and the enteroviruses. In infancy, again, the agents are the pathogenic Escherichia coli, the enteroviruses, and parenteral infections. In childhood acute diarrhea is less frequent and less severe. The morbidity and mortality are markedly reduced. In this age group there are the additional factors of emotional disturbances, antibiotic-induced diarrhea, and our old friend, the Staphylococcus aureus. In the older child there are also the infections due to viral agents, food allergies, various metabolic disorders, the malabsorption syndromes, and the aganglionic megacolon.

One of the problems in attempting to find a specific etiologic agent for the acute diarrheas has been the problem of whether the so-called normal flora may actually be pathogens. The consensus of opinion at the present time is that under certain circumstances they may well be. Since methods have been developed to type by agglutination members of the Escherichia coli group, three serotypes have appeared which apparently have been implicated as pathogens: 0111B4, 055B5, and 0127B8.[3] While other types have also been implicated, at the present time these three are the most important. The characteristic clinical picture of diarrhea caused by these organisms is that of a severe gastroenteritis which develops after an incubation period ranging from 2 to 18 days. There are no signs and symptoms which differentiate it from other forms of severe gastroenteritis. The majority of cases have occurred in children under 1 year of age. The mortality rate varies. It is extremely communicable, and there is a high rate of cross-infection. In addition, the problem of the asymptomatic carrier has not been solved. Chloromycetin has a specific suppressive effect on Escherichia coli 0111B4, but leaves the rest of the group relatively unaffected.[3] The most effective agent available today appears to be neomycin. It is as useful as Chloromycetin in improving the clinical picture and appears to be superior to it in the treatment of carriers.

The pathogenicity of the Paracolobactrum organisms is problematic. Demonstration of a significant antibody response in individuals appears to prove

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It is essential to remember that laboratory data can be exceedingly misleading and must be interpreted in the light of the clinical condition of the patient. There is no substitute for the acumen and clinical judgment of the experienced physician

that under certain circumstances these organisms are definitely pathogenic. It is probable that the strains Arizona, Bethesda, 29911, and Melbourne are the pathogenic members of this group.[3]

Proteus is not a natural inhabitant of the intestinal tract of breast-fed infants. Epidemics of diarrhea have been attributed to the presence of Proteus vulgaris and Proteus mirabilis.[3]

Infection with Pseudomonas may be rapidly progressive and carry with it a significant mortality.

Since the advent of the antibiotics it has been obvious that changes in the respiratory and gastrointestinal flora have been an important complication of these medicaments. The production of staphylococcal enteritis and the overgrowth by yeasts and fungi, particularly Candida albicans, have been serious complications. The use of the oral antibiotics has been more frequently associated with monilial infections. Staphylococcal enteritis may give the same clinical picture as pseudomembranous enterocolitis. The clinical picture consists of diarrhea, shock, and abdominal distention, and the mortality is high.[5,6]

Diagnosis of dehydration

Theoretically speaking, diarrhea presents no problem if the electrolyte balance and nutritional status of the patient can be maintained at a level compatible with life. Practically speaking, over prolonged periods this is usually impossible. The problem becomes magnified in the younger child because of the greater amount of total body water and relatively immature renal function. It has been shown that there is variable maturation of renal function in the younger child as reflected in the indices of glomerular and tubular activity. Consequently, the glomerular filtrate rates relative to body surface area are low, and an even greater reduction is present in some, but not all, of the secretory and reabsorptive functions of the tubules.[7] The most common fluid problem encountered by the physician taking care of children is acute dehydration and acute electrolyte depletion. Increases of water or electrolytes occur less frequently but, since the popularization of oral electrolyte-containing solutions, have become an increasingly serious problem. As Elkinton and Danowski point out, "Two important differences distinguish these developments from similar disorders in adults: deficits and excesses are incurred more rapidly in children, and such deficits or excesses are usually not complicated by a background of arteriosclerosis, congestive failure, or intrinsic renal disease." Parenteral fluids are indicated whenever the child is not capable of taking and retaining an adequate intake via the gastrointestinal tract.

Clinically speaking, dehydration may be evaluated on the following points: (1) Visible dryness of the tongue and mucous membranes, and stringy oral secretions; (2) sunken anterior fontanel; (3) reduced tissue turgor (the skin of the abdominal wall is pinched up between the thumb and index finger, and if the fold persists for several seconds after being released significant dehydration is present—although this is not necessarily true of the patient with hypernatremia, as will be discussed later); (4) weight loss; (5) fever; (6) history of reduced fluid intake; (7) reduced frequency of urination; and (8) dark or concentrated urine.[1] To this list I would add sunken eyes with a loss of the normal secretions over the conjunctiva. Lethargy, coma, or irritability, depending upon the type of deficit, are often present. The diagnosis of mild, moderate, or severe dehydration is one of the difficult problems that is presented to the physician. Certain guides may be of use. As an example, the weight in grams of the dehydrated infant subtracted from the exact weight of the healthy infant will be the fluid loss in cubic centimeters. In addition, it is useful to know that mild dehydration occurs with a decrease of 2.5 to 5 per cent of the body weight, while moderate to severe dehydration occurs with a loss of 5 to 15 per cent of the body weight.[2]

Accurate laboratory data are of inestimable value in the initial appraisal of the patient's status. In addition, initial baseline data followed by frequent laboratory reappraisals, taken in light of the patient's condition, make the physician's job much easier. It is of value to know the relatively normal values of your specific laboratory. There may be a variance of anywhere from 5 to 10 mEq. per liter between laboratories. In our institution we accept the following as normal values: sodium, 140 to 143 mEq. per liter; potassium, 4 to 6 mEq. per liter; chloride, 103 to 109 mEq. per liter; and carbon dioxide, 25 mEq. per liter.

It is essential to remember that laboratory data can be exceedingly misleading and must be interpreted in the light of the patient's clinical condition. There is no substitute for the acumen and clinical judgment of the experienced physician. In cases of acute diarrhea our initial laboratory appraisal consists of stool culture, nasopharyngeal culture, blood culture when indicated, hematocrit, hemoglobin, serum sodium, potassium, chloride, and carbon dioxide. On occasion tests for nonprotein nitrogen and blood urea nitrogen are also performed.

From the initial laboratory appraisal and clinical

evaluation of the patient are assembled the baseline data to guide in initial therapy. It is important to remember that one might be lulled into a sense of false security by what are apparently normal laboratory values when in actuality they are an index of severe dehydration. A hematocrit reading of 40 might seem normal but in the anemic child it would indicate severe dehydration.[8] A serum sodium of 143 mEq. might indicate to the inexperienced observer that all is well and parenteral fluids are not justified, when in actuality there may be severe isotonic dehydration. As has been pointed out succinctly by Elkinton and Danowski:[7]

> In patients in whom the history or physical findings indicate a change in the *total amount* of water or electrolytes, a normal *concentration* suggests that the disturbance is not as pronounced as it is when the concentrations are abnormal. However, it must be kept in mind that a single determination of the serum concentration of an electrolyte gives little physiological information in itself because of the fairly extensive range of normal values. Thus a value in the lower range of normal could be considered a "low normal" or could represent a clinically significant lowering of the concentration. It must therefore be interpreted in the light of other information. The term "interpretation" is used advisedly because in the absence of measurements of *volume*, determinations of *concentration* give no direct *knowledge* of the *total amount* of the solute in question. For this reason: *concentrations of electrolytes as determined in serum have to be interpreted in light of the clinical history and physical findings in the patient, the pathological physiology of the disease, if the latter is known, and the immediate prior fluid balance or fluid therapy of the patient.*

For practical purposes levels of electrolytes provide valuable clues in determining therapy. As a general rule, when there is depletion of electrolytes deficits are less extensive if the levels are unchanged than if the values are lowered or raised. Either of the latter alterations suggest that the initial adjustments which maintain concentrations at the expense of volume or total amounts are either no longer operative, undesirable, or inadequate. This fact in turn suggests that quantitatively a much greater degree of depletion is present than can be measured in the average hospital laboratory at the present time.[7]

Replacement therapy

Irrespective of the laboratory data a critical evaluation of the pretreatment status of the depleted patient is necessary. This includes a careful review of the history, attention to the physical findings, and reliance upon past experiences with regard to the particular disease entity under scrutiny. It cannot be emphasized too strongly that as valuable as the contribution from the laboratory is in dealing with fluid and electrolyte disturbances there is no substitute for a knowledge of the pathologic physiology and the experience of the competent observer. Too often the laboratory results, while accurate, are open to misinterpretation because of lack of careful evaluation of the clinical condition of the patient in light of the history and altered physiology.[7,8]

Since in most pediatric cases the regulatory or homeostatic mechanisms are functioning properly the trend is toward the administration of a dilute fluid which contains glucose, sodium, potassium, and

Irrespective of the laboratory data a critical evaluation of the pretreatment status of the depleted patient is necessary. This includes a careful review of the history, attention to physical findings, and reliance upon past experiences with the particular disease

chloride, in amounts which are adequate for replacement if such are needed, but which if not needed can be readily and safely excreted. In other words, the body will make all the necessary adjustments if it is given the suitable materials with which to do so. The primary difficulty, of course, is giving too little or too much.[7] This may be avoided by utilizing the "floor" and "ceiling" values suggested by Talbot, Crawford, and Butler.[9] These levels are:

	Floor	*Ceiling*
Glucose	75.0 grams/m²/24 hours	350 grams/m²/24 hours
Sodium	10.0 mEq./m²/24 hours	225 mEq./m²/24 hours
Potassium	10.0 mEq./m²/24 hours	225 mEq./m²/24 hours
Phosphorus	0.3 grams/m²/24 hours	2 grams/m²/24 hours
Water	0.7 cc./mOm. of solute	10 cc./mOm. of solute

These solutions are given intravenously. Since they are hypotonic to body fluids, when given subcutaneously they will remove extracellular electrolytes from the patient and may cause circulatory collapse. Potassium is always withheld until the renal status of the patient has been evaluated.

In our Department of Pediatrics fluids are administered by the body surface area method. The obvious advantage of this is that the average water and electrolyte intake per unit of surface area is the same in all age groups. The primary disadvantages have been the fact that the average physician is unfamiliar with this method, and that previously there has been no easy means available for these determinations.[10] This has been overcome by utilizing the chart of Benedict and Talbot[11] in which the weight of the patient in kilograms may be easily transferred to square meters of surface area. Certain basic figures must serve as a guide to this replacement therapy.

Maintenance water intake in all age groups is 1,500 cc. per square meter of body surface per day. The minimum requirement would be 700 cc. per square meter per day, and the maximum would be 2,700 cc. per square meter per day. Sodium and potassium as shown in the "floor" and "ceiling" values have a minimum of about 10 mEq. per square meter of body surface per day, with a maximum value of approximately 225 mEq. per square meter per day.

The average individual has a daily intake of sodium and potassium of about 40 to 60 mEq. per square meter of body surface per day for each of these electrolytes. A carbohydrate intake of between 60 and 75 grams per square meter of body surface per day will minimize ketosis and tissue catabolism.[9]

Utilizing the above figures, the following values are computed: 1,500 cc. of fluid per day for maintenance, 2,400 cc. of fluid per day for moderate dehydration, and 3,000 cc. of fluid per day for severe dehydration. These are all in cubic centimeters per square meter of body surface area per 24 hours.[12]

From this it is easy to see that an infant admitted in moderate dehydration weighing 5 kilograms would have a surface of .29 square meters. Since we have stated that 2,400 cc. of fluid per square meter per day are necessary in the moderately dehydrated patient, $2{,}400 \times .29 = 696$ cc. of fluid to be administered in the first 24 hours. Utilizing a requirement of sodium and potassium of somewhere between 20 and 60 mEq. per square meter per day and arbitrarily utilizing the figure of 40 mEq. per day: 40 mEq. per square meter of sodium $\times$ .29 square meters $=$ 11.6 mEq. of sodium in the first 24 hours. The figure is the same for potassium. However, potassium is not utilized until it is certain that the urinary flow of the patient is adequate. Therefore, in the first 24 hours the patient will receive a total 696 cc. of fluid containing 11.6 mEq. of sodium and 11.6 mEq. of potassium, the potassium being added to the solution once adequate urinary flow has been established. In reality we may use figures double the above in the average case. However, this serves as a rough outline for therapy. In many instances initial hydration is treated by using a half normal saline or third normal saline in the amount of 360 cc. per square meter of body surface area, given within 45 minutes.[13] I have also utilized this method successfully. In this instance the initial hydrating solution is then subtracted from the total 24-hour requirement.

The above shows a method which is applicable in most instances of fluid and electrolyte deficits in infancy and childhood. However, we come to a relatively more complicated problem in the situation in which the child is admitted with hypernatremia. Figures of 150 mEq. per liter and above are considered indices of hypertonic dehydration; a serum sodium below 130 mEq. per liter is considered an index of hypotonic dehydration.[14] In one series of cases the mortality of children with diarrhea with an initial serum sodium under 150 mEq. per liter was just under 2 per cent; those with a concentration above 150 mEq. per liter had a mortality of 11.6 per cent.[14] Our experience is similar to this. These children are difficult to handle and one treads a relatively thin line of safety in their management. The majority of those children admitted with a hypernatremia have a history of curtailed water intake for a period of 24 hours or more prior to admission. In addition, a good share of these infants have been treated at home with a commercial oral electrolyte solution, Lytren. This is a powder and when reconstituted supplies 380 calories of carbohydrate, 50 mEq. of sodium, 20 mEq. of potassium, 4 mEq. of sulphate, 30 mEq. of chloride, 10 mEq. of phosphate, and 4 mEq. of lactate per liter.[15] The diagnosis in many instances may be delayed because there is no increase in skin elasticity in these children. They have a doughy or velvety texture of the skin and subcutaneous tissues. In addition, the admitting signs and symptoms may be those which appear referable to the central nervous system: increased muscular tone, in some instances with a marked spasticity of the extremities, exaggeration of the deep tendon reflexes, convulsions, and/or irritability and coma. These children usually do not appear to be significantly dehydrated.

Finberg and Harrison[14] recommend 200 cc. of fluid per kilogram of body weight in the first 24 hours with a concentration of sodium of from 15 to 40 mEq. per liter. We have not been successful in utilizing fluids as dilute as these over a 24-hour period. In two of our cases convulsions occurred at the end of 12 hours, and in one case a tracheotomy was necessary. Physiologically it appears that the rapid restoration of body fluid osmolarity using exceedingly dilute solutions may cause water intoxication. With the cessation of the markedly dilute solutions and utilization of one in which the concentration of sodium was somewhere between 50 and 65 mEq. per liter we were able to alleviate the convulsive disorders where previously calcium gluconate had been unsuccessful. Such a solution can be prepared by using one part of sixth molar sodium lactate, two parts of 0.9 per cent sodium chloride, and four to six parts of 5 per cent glucose in water.[16]

In a recent evaluation done at our institution we found that approximately 20 per cent of the infants admitted with diarrhea in fluid and electrolyte imbalance had been suffering from hypernatremia. Consequently, we feel that this is a significant entity. We have abandoned the use of the oral electrolyte-containing solution prior to the institution of parenteral fluids unless the oral solution is diluted in twice the amount of water that is recommended by the manufacturer. This then gives a concentration of sodium of approximately 25 mEq. per liter instead of 50 mEq.

The trend is toward prescription of a dilute fluid which contains glucose, sodium, potassium, and chloride in amounts which are adequate for replacement if such are needed, but which if not needed can be readily and safely excreted

Acute and chronic diarrhea

In the last 30 cases of acute diarrhea analyzed by us the patients ranged from 3 months to 7 years. Eight patients had what we felt were significant bacterial infections responsible for the diarrhea. Three of these were due to pathogenic Escherichia coli, two to Shigella, one to Paracolobactrum, one to Pseudomonas, and one to a resistant Staphylococcus aureus. Neomycin was the most effective antibiotic with chloramphenicol running a close second. I utilize antibiotics only when there is a definite indication as shown by culture. In my hands the use of the broad-spectrum antibiotics in the acute diarrheas of infants and children has been exceedingly disappointing. I have used practically all that have been placed on the market including the combinations of antibiotics. Subsequently I have been forced to discontinue their use and have gone back to a remedy which we sometimes forget. My best results have been with paregoric (camphorated tincture of opium) used in a dose of 1 minim per month of age up to 12 months. It is increased gradually thereafter up to 2 cc. for a child of 5 years and 4 cc. for a child above this. We repeat it every 3 hours unless drowsiness or respiratory depression appears.

No discussion of acute diarrhea of infancy and childhood would be complete without some mention of the enteroviruses. Since 1950 more than 100 have been characterized and distinguished from other known types. The group making up the enteroviruses includes coxsackie, ECHO, and poliomyelitis viruses. They enter through the oropharynx, incubate and multiply in the intestines, and disseminate in the feces. Signs and symptoms vary anywhere from a mild illness to a severe protracted disease. It is probable that a large percentage of the cases of acute diarrhea of infancy and childhood are caused by enteroviruses.[17]

The chronic diarrheas usually occur in the latter months of the first year and during the second year. They are usually heralded with the passage of frequent, bulky, frothy, foul-smelling stools in a child on a normal diet. They may be consistent or intermittent.[2] In the younger child these findings may be absent and may be manifested only as colic and irritability. The signs that are present are not specific for any one disease but are those of chronic starvation if the diarrhea has been present over a prolonged period. These include retardation of growth; wasting, particularly of the extremities, the buttocks, and trunk; abdominal distention; and numerous associated nutritional deficiencies such as those of iron and vitamins A, B, C, D, and K.[2] With chronic digestive disturbances I usually suspect mucoviscidosis (cystic fibrosis of the pancreas), particularly when they are associated with respiratory disturbances, gastrointestinal allergies, and idiopathic celiac disease.

In any chronic digestive disturbance a variety of laboratory investigations must be performed. Congenital abnormalities of the gastrointestinal and genitourinary tract are eliminated by appropriate x-ray studies. The possibility of chronic infection is eliminated by stool cultures, urine cultures, blood counts, sedimentation rate, serum agglutination reaction, tuberculin tests, and so forth. Mucoviscidosis may be readily diagnosed by appropriate laboratory studies. It is always wise to consider this in the differential diagnosis of chronic digestive disturbances. Since it is a disturbance of the mucus-secreting glands one usually sees some type of respiratory disturbance in which abnormal mucus production and cough are present.[18] The use of the sweat electrolyte test as first devised by di Sant'Agnese and modified by Shwachman is the simplest and most useful evaluation at the present time. A value of sodium above 80 mEq. per liter or a value of chloride above 70 mEq. per liter are apparently characteristic of mucoviscidosis.[19]

The diagnosis of gastrointestinal allergy to foods is essentially a clinical one. Figures on the incidence of this entity vary considerably; depending upon the author it varies from 1 in 15 to 0.3 per cent.[20] It has been postulated that the milk-sensitive infant falls into one of four categories: He may be sensitized to the factor common to both cow and human milk, lactalbumin, or to the species-specific factor of cow lactalbumin only. With either of these categories there may be sensitization to casein as well. Finally, and much less frequently, he may be sensitized to casein alone. While human and cow lactalbumin are completely species-specific, this is not so in the case of animals as closely related as the cow and goat. Lactalbumin is heat labile, and there is a decrease in its antigenic properties as temperature is increased. This explains why in some instances evaporated cow's milk in which lactalbumin is denatured by heat is often satisfactory in the feeding of milk-sensitive infants. Casein, however, is relatively heat stable.[21]

The symptoms to milk allergy vary widely and include skin rashes, vomiting, diarrhea, irritability, colic, asthma, rhinorrhea, and so forth. The essential treatment is removal of the offending allergen from the diet and replacing it with a food which provides necessary basic requirements. Soy bean milk and hydrolyzed casein preparations such as Nutramegen are at present utilized with good results.

In a recent evaluation done at our institution we found that 20 per cent of the infants admitted with diarrhea in fluid and electrolyte imbalance had been suffering from hypernatremia. Consequently, we feel that this is a significant entity

Celiac disease

Celiac disease is an ill-defined entity. To some it is a disease, to others a syndrome. The diagnosis is used interchangeably for a series of patients who present a wasted and old-looking appearance; distended abdomen; small, flaccid buttocks; and frequent occurrence of bulky, foul-smelling, frothy stools. In addition, these patients are irritable and negativistic. Some have petit mal lapses during the day,[22] although I have seen only one such case. As pointed out above, these signs and symptoms are not specific for any one disease entity. There appear to be many variants of this syndrome, and when the condition of nutrition is only slightly affected and when the stool changes are minor or intermittent there my be great difficulty in making the diagnosis.[18] In a majority of these instances the diagnosis is made by therapeutic trial of diet. I have seen many children with what I believe to be variants of the celiac syndrome or a mild celiac disease. At one time it was felt that a patient with celiac disease was one who had a specific response to the celiac diet. However, the celiac diet has varied from author to author and from year to year. To many it means the addition of banana to the diet, the restriction of fat, and the restriction of certain forms of carbohydrates. Holt[23] defines it as "a state of malnutrition induced by a poorly understood chronic functional disorder of intestinal assimilation." While this is a comprehensive definition it certainly does not make the diagnosis any simpler.

The diet used most frequently over the last few years has been that popularized by Dorothy Andersen, which is based on the assumption that the celiac syndrome is a starch intolerance as revealed by starch granules in the stool. Therapy then consists of a diet low in starch and relatively high in protein. However, the reliability of stainable fat and starch granules in the stool has always been open to question. As Holt[23] has pointed out, the percentage of fat in the stool is not to be relied on as a measure of absorption. While it is true that when given a poorly tolerated foodstuff such as fat, the fecal loss is increased, there was also an increase in its absolute absorption. This is known as "the therapy of use." In addition, by the use of radioactive isotopes Holt[23] was able to show that the absorption of sugars in patients with the celiac syndrome approximated 99.2 to 99.9 per cent.

Obviously, then, neither diagnosis nor therapy of celiac disease has been satisfactory in previous years. Probably the most important advance has been made within the last decade in which the sensitivity to gluten has been implicated as the prime pathologic phenomenon. "Gluten may be considered the axis around which the celiac wheel revolves."[22] A chance observation by Dicke in Holland during a famine in World War II led to our present therapy. These results were reported by him in 1950. He observed that children with celiac disease did well under periods of starvation but, when food became more plentiful and cereals were reintroduced into the diet, these patients regressed to their previous state.[24]

Wheat gluten consists of two fractions: glutenin and gliadin. It appears that glutamine, the largest component of gliadin in its bound form, is responsible for the celiac effect.[25] It is found in wheat, rye, and oats, but is absent in corn, rice, and potatoes. In my experience the restriction of gluten has been exceedingly effective. In addition, it is a very useful therapeutic test. However, it should be pointed out that before any results are seen with gluten restriction it may take 2 to 6 weeks of a gluten-free diet. Consequently a continuance of symptoms prior to 6 weeks of gluten restriction cannot be considered a failure.

The best guide of therapy is the alleviation of symptoms along with the measurement of height and weight. On the gluten-free diet the patient usually gains above average height and weight increments. If he keeps even with the norms, the diet may have been relaxed prematurely.[22]

Unfortunately, one of the difficulties with the gluten-free diet has been confusion as to what are gluten-containing foods. The American literature is relatively scarce when it comes to effective gluten-free diets. For the majority of the material to be presented below I am grateful to Dr. Bernard Kay,[26] resident in pediatrics at Still Hospital. Most of this material has been gathered by him on a trial and error basis while treating his own child who suffers from the celiac syndrome. Some additional material has been gained from the Department of Dietetics at the Mayo Clinic, Rochester, Minnesota, and from the gluten-free diet as put out by the University of Michigan. Three basic cereals are acceptable: Sugar Rice Krinkles, Sugar Corn Pops, and Puffed Rice. Rice Krispies, Corn Flakes, and most others contain malt which is not acceptable. Rice crackers, rice cookies, soy bean cookies, and cereal-free mayonnaise, made by the Cell-U Corporation of Chicago, Illinois, are acceptable. It is of interest that Kraft's Miracle Whip and the majority of other mayonnaises on the market at the present time contain wheat and are not acceptable. Unfortunately, the manufacturers of most products are exceedingly uncooperative in providing the physician with this information.

Potato, rice, soy bean, buckwheat, and pure wheat starch (gliaden-free) are acceptable flours. Potato flour may be utilized in making sponge cake. Soy bean flour must be used with the others and never in a proportion of less than 1:8, or else the bread or cake will fall apart. Banana may be added to these flours to make a bread with an acceptable flavor. However, it should be pointed out that this bread will not rise and that with the addition of banana it gets stale faster. In certain cities, such as Detroit, it is possible to order a gluten-free bread at approximately $1.25 per loaf. Excellent pancakes may be made with rice flour.

Certain of the commercial chocolate beverages such as Bosco and Ovaltine contain cereal or malt grains and are not acceptable. Hershey's pure chocolate is acceptable and when combined with marshmallow will make an excellent candy.[26]

In most large communities it is advisable for the physician to check with the local health food store.

Although in many instances these people are frowned upon as being food faddists, they are usually experts on the constituents of prepared foods and can give one much additional valuable information.

In those instances of chronic nonspecific diarrhea in which diagnosis cannot be arrived at, in which symptoms have not been alleviated by milk-free, gluten-free, or low-starch diets, the recommendation of Cohlan[27] may be followed. Diiodohydroxyquinoline (Diodoquin), one tablet (0.22 gram) twice daily for 1 to 2 weeks, may be effective. He reports good results manifested by subsidence of diarrhea in 1 to 4 days and ability to tolerate a full diet. I have been much impressed with its results in two or three cases in which all other measures had failed. The reason for the effectiveness of this medicament is unknown. It may affect some fundamental mechanism common to nonspecific diarrhea.

Summary

Acute and chronic diarrheas have been discussed. The difficulty of making a definitive bacteriologic diagnosis in acute diarrhea has been pointed out, as have the pitfalls of antibiotic therapy. A brief outline of practical fluid and electrolyte therapy has been given. A discussion of the chronic diarrheas has pointed up the value of the sweat electrolyte test in mucoviscidosis and the difficulty of effective definition of the celiac syndrome. The efficacy of the gluten-free diet in the celiac group has been emphasized. The occasional usefulness of diiodohydroxyquinoline in certain nonspecific diarrheas has been discussed.

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Trypsin: An adjunct to rectal surgery*

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Fear of rectal surgery is legendary. Adjustment to disease and reaction to a threatened operation depend upon the total personality organization and life pattern. It therefore becomes difficult to judge the emotional processes of the patient in a type of study where obtunding agents are not specifically used.

Surgical disorders

The most common disorders of the rectum and anus are hemorrhoids, fistulas, and fissures. Of these conditions, hemorrhoids are most common, affecting about one fourth of the adult population.

Hemorrhoids may be defined as localized varices of the hemorrhoidal plexus. There are two defined types: internal, which arise from the submucous plexuses above the anal sphincter and drain ultimately into the portal system; and external, which arise from the subcutaneous plexuses outside the sphincter and drain into the general venous system.

The pathologic picture of hemorrhoids is one of inflammation, essentially a thrombophlebitis. Hemorrhoids are frequently swollen and painful. The etiologic factor or factors may be trauma resulting from food residues, large hard stools, or diarrhea, plus infection.

Many cases of hemorrhoids can be treated conservatively by such measures as proper diet and regulated bowel habits. Proper anal hygiene is most essential. Suppositories containing mild astringents and topical anesthetics may be prescribed.

There are cases which do not respond to these conservative measures. In such cases surgical excision is indicated.

Fissures, linear ulcers of the anal ring, are usually extremely painful. Of greatest discomfort and trouble are those fissures which develop as a result of trauma, proctitis, venous stenosis, or underlying infection.

Conservative treatment of fissures, as in the case of hemorrhoids, includes consistently good anal hygiene and protection from added injury and infection. In severe cases of fissures, gentle dilatation under local or general anesthesia, or complete excision of the ulcer, is required.

Fistulas are the result of previous abscesses, usually proctogenic. Treatment in these cases is surgical.

Rationale for postoperative trypsin administration

Surgical intervention in hemorrhoids, fissures, and fistulas frequently results in postoperative edema, inflammation, and pain. It is not unusual for the patient to complain of motor vesical problems for 48 to 72 hours after operation. This is particularly true in men because the sphincteric structures are more organized.

Innerfield, Angrist, and Schwarz[1] concluded from their studies that crystalline trypsin is indicated in inflammatory conditions regardless of etiology. It has been reported[2] that inflammation, pain, and edema were resolved with the use of crystalline trypsin in half or less than half the time required with other forms of therapy. Some laboratory studies by Martin, Brendel, and Beiler[3] demonstrated that local edema and inflammation are prevented equally well with cortisone and trypsin; however, in the case of cortisone, pretreatment is required for several days, whereas with trypsin the time required is one-half hour or less.

According to Martin[4] trypsin administered parenterally in therapeutic doses acts at the inflammatory site. At the site of inflammation, trypsin functions as a depolymerase and may also cause some plasmin activation. It seems plausible that fibrin, by adsorption, concentrates the depolymerizing proteolytic enzymes. This localized concentration of enzyme reverses the fibrinogen-fibrin reaction; the macromolecules are removed from the protein network wall of

*The work reported in this paper was conducted at the Delaware Valley Hospital, Bristol, Pennsylvania.

TABLE I—CLINICAL DATA ON 21 PROTOLOGIC SURGICAL CASES

Case no.	Age	Sex	Diagnosis	Anesthesia*	First day postoperative pain	Postoperative urination†	First postoperative day
1	56	M	Hemorrhoids, fistula	SB	None	C	Tenderness and discomfort
2	67	F	Stenosis	SB	None	S	Active, alert
3	52	M	Hemorrhoids	SB	Minimal	S	Ambulant
4	48	M	Hemorrhoids	SB	None	C	Very active
5	48	M	Prolapse, hemorrhoids	SB	Required one 50 mg. dose of Demerol	S	Ambulant
6	34	M	Fistulas, hemorrhoids	SB	Required two 50 mg. doses of Demerol	S	Inactive, fearful
7	67	M	Anal stenosis	SB	Required one 50 mg. dose of Demerol	S	Active, ambulant
8	38	M	Hemorrhoids	L	None	S	Active, alert
9	40	M	Hemorrhoids	SB	Required two 50 mg. doses of Demerol	S	Ambulant
10	54	F	Hemorrhoids	L	Required one 50 mg. dose of Demerol	C	Active
11	42	F	Hemorrhoids	SB	None	S	Active
12	55	M	Prolapse, thrombosed degenerating hemorrhoid	SB	Required one 50 mg. dose of Demerol	C	Ambulant, complaining
13	46	M	Fistulas, hemorrhoids	SB	Minimal	S	Active, some discomfort
14	54	F	Hemorrhoids	SB	None	S	Active
15	35	F	Hemorrhoids	SB	Required one 50 mg. dose of Demerol	S	Active, some tenderness
16	49	M	Hemorrhoids	SB	Required one 50 mg. dose of Demerol	C	Ambulant, very active
17	29	M	Fistula, hemorrhoid	SB	None	S	Ambulant, active
18	70	F	Fissure, hemorrhoid	L	Aspirin, 5 grains, Codeine, ½ grain	S	Very active and alert
19	32	F	Hemorrhoid, fissure	SB	None	S	Ambulant in 5 hours
20	34	F	Prolapsed hemorrhoid	SB	None	S	Ambulant in 5 hours
21	30	F	Hemorrhoids	L	None	C	Ambulant in 8 hours

*SB = Saddle Block; L = Local; †C = Catheterized; S = Spontaneous

the capillary. The porosity is then increased and the intercellular fluid is released. Hydrostatic pressures are reduced, capillaries open, biologic continuity is restored, and local circulation is restored. With that restoration, the multiple defensive forces of the blood are brought into play and all soft fibrin deposits are removed.

The trial of crystalline trypsin as an antiphlogistic-antiedema agent in cases of rectal surgery was prompted by the occurrence of several cases of temporary bladder paralysis following enthusiastic postoperative use of narcotics by hospital personnel. Faintness at the effort of urination in the first hours postoperatively is not unusual. Valsalva's maneuver, particularly at the beginning and termination of micturition, sends the blood peripherally.[5] After proctologic surgery the patient must be cautioned to avoid this maneuver, because a strain at the operative site could initiate hemorrhage. At our hospital it was decided to try trypsin to reduce postoperative edema and to facilitate spontaneous urination, particularly when the patients had had saddle-block anesthesia. Surgeons who have had occasion to return to the rectum to deal with an emergency situation soon after an operation can appreciate the extensive edema that can and does occur in many cases.

Materials and procedure

Twenty-one cases of proctologic surgical problems made up the present series. These included internal and external hemorrhoids, fistulas, fissures, and stenosis. The patients, age, sex, and diagnosis are listed in Table I.

Laboratory studies, including complete blood counts, blood glucose, blood urea nitrogen, coagulation and bleeding times, urinalysis, and chest x-rays, were performed in all patients. An electrocardiogram was taken for all patients over 40 years of age.

Rather than starting trypsin treatment postoperatively, with a race between time and the inflammatory-edema tide, it was decided to start such treatment preoperatively. Essentially, the orders governing these cases were 1 cc. or 5 mg. of the crystalline trypsin (Parenzyme A)* intramuscularly on the day before and the morning of operation. The dose was continued to the day of hospital release, usually 4 days postoperatively. In the last three patients, injections of trypsin were given upon waking on the day of operation and immediately postoperatively. Enteric-coated tablets of trypsin (Orenzyme),* two tablets every 6 hours for three doses

*Supplied for this study by the National Drug Company, Philadelphia, Pennsylvania.

daily, starting on the first postoperative day, were prescribed. No long-acting anesthetic, tranquilizers, or the so-called mood drugs were used. Ice or heat packs were used at the operative site, and the surgical resident was held responsible for its pin-point location.

Pontocaine was used for saddle-block anesthesia and Xylocaine for local anesthesia. The dose was dictated by the magnitude of operative procedure necessary to correct existing defects.

Postoperative directions allowed only two doses of Demerol of 50 mg. each. Further sedation had to be qualified by a personal review of the problem. Most surgeons routinely order ¼ grain of morphine or 100 mg. of Demerol as needed.

The patients were followed up postoperatively at 4 weeks, 2 months, and 6 months.

Results

The type of anesthesia used, pain on first day postoperatively, postoperative urination, and condition of patient on first postoperative day are listed in Table I.

The first postoperative effect noted in most of the patients was an increased agility in walking, turning, and mounting the bed for examination. There was a lack of subjective complaints in more than half of the patients. The slow, guarded shuffle and splinted buttocks so often associated with proctologic surgery were definitely lacking. No temperature rose above 99.4 F, and there was no evidence of postoperative malaise. Fifteen patients urinated spontaneously; six required catheterization. Eight patients requested sedation and were given one 50 mg. dose of Demerol; only two required a second dose.

No postsurgical spinal headaches were reported, nor were there secondary urinary difficulties. In the past it had not been unusual to have patients faced with hesitancy of micturition for as long as 3 days postoperatively. Some of these problems can be elicited only by careful questioning, since the patient may simply consider it a part of the surgical problem.

One patient (Case 13) with a history of a healed myocardial infarct, volunteered the information that his urinary function was much improved over his preoperative function. It is of interest that he required no narcotic or analgesics following surgery.

The stenosis problems (Cases 2 and 7) were of interest because of the age of the patients; both were 67 years. The woman (Case 2) had suffered for more than 40 years with an anal outlet that did not admit even the small finger. The problem in Case 7 was of 3 months' duration. Both patients had had previous operations elsewhere. The woman required no sedation; the man required one 50 mg. dose of Demerol postoperatively. An interesting observation was that the man was found comfortably seated on a wooden chair playing cards the morning after his operation. Following his previous operation, he had required three doses of narcotics.

It must be admitted that the problem of the first stool passage after operation did not attain the hoped-for relief. Local measures are no doubt the best answer to this vexing problem.

Comment

Every effort was made to prevent enthusiasm from clouding clinical judgment; however, I have no doubt that the use of crystalline trypsin has a definite therapeutic stature in proctologic surgery. Its use frees hospital personnel, reduces the need for sedation, and promotes the patients' general welfare. Preoperative use of the trypsin doubtless enhances results.

The use of a single minimal dose of a sedative, or as was frequently observed in this study, no sedative needed postoperatively, represents a milestone in proctologic surgery. One of the two exceptions was the patient in Case 9, a police officer, who questioned all personnel constantly, including the authenticity of his surgeon.

It is my feeling, after a careful review of our clinical data, that crystalline trypsin is a worth-while adjunct in anorectal problems.

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Kinematic analysis and classification of vertebral motion*

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1. Introduction

1.1 • The analysis of vertebral motion which this thesis presents is a development of the R-center method, previously described in THE JOURNAL.[1] Basically, the problem of analyzing vertebral motion involves two things: (1) Recording the relative displacement that occurs between adjacent vertebrae when a spine bends, and (2) establishing the physical significance of this relative displacement. Once this has been done, it becomes possible to study the motion between the vertebrae of the spinal column and distinguish the normal modes of behavior from the abnormal. This analysis can then help as a means of understanding the physical nature and condition of intervertebral motion.

1.2 • The first part of this analysis of vertebral motion is accomplished by juxtaposing a series of x-ray negatives taken of the vertebral region of each subject so that the relative displacement of each vertebra, with respect to its adjacent (lower) vertebra, can be noted. To achieve this process of recording the displacement of vertebrae, the R-center method utilizes a kinematic principle known as Euler's theorem. This theorem states that any relative displacement between two rigid bodies, in which the motion of this displacement lies in a plane, can be produced by a simple rotation of one rigid body with respect to the other about an axis perpendicular to this plane of motion. This means that no matter what type of complicated motion actually occurs within a plane *resulting* in a displacement of an object from position A to B, this same net displacement can be produced by one simple and hence equivalent rotation about one axis perpendicular to the plane. This axis of equivalent rotation is called the "resultant" axis, by Rosenberg,[1] and the point which this axis makes through the plane of motion is called the R-center of the motion ("R" standing for "resultant"). The relative displacement of each vertebra with respect to its lower vertebra is represented as a rotation about a point lying in the plane of motion (Fig. 1).

It is obvious, however, that the vertebra does not necessarily rotate about this R-center during the actual motion. The movement may consist of one or more translations, combined with one or more rotations about a whole series of different axes. Hence, the R-center merely serves as a means of recording the *net displacement* of the motion, and *not the motion itself*. In order for the net displacement to approximate the actual motion, it would be necessary to take a whole series of very small displacements. Indeed, if it were possible to record infinitesimal displacements, the result would be a series of R-centers that would describe the actual motion of displacement. Since this is not physically possible, a study is made instead of a series of reasonably small displacements, assessing their significance to the motion process as a whole.

1.3 • Since there is available this method for recording vertebral motion, the next step is to analyze the physical meaning of these centers of rotation. In particular one must analyze the significance of having an R-center pattern that is distributed throughout the entire area of the spinal column. In

*The development of the described method for analyzing the kinematics of intervertebral motion has been accomplished by Michael Kosok, B.S., of the Physics Department of Fairleigh Dickinson University. In addition, Mr. Kosok has developed the procedure for coding and equating the findings on each subject to aid in statistical evaluation.

This new procedure for analyzing intervertebral motion is a modification and further development of the R-center method of Rosenberg.[1]

J. Russell Moser, D.O., has concurrently been examining these subjects and recording the palpatory findings of the intervertebral motions of the lumbar segments. He has aided much by finding subjects for the study. More and more people resist submitting to the taking of several x-ray films.

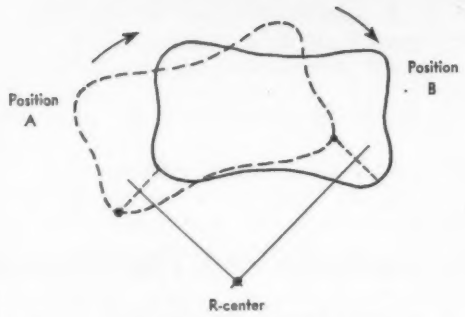

Fig. 1. The R-center represents the mathematical center about which a given vertebra can rotate in order to produce a certain observed displacement from position A to position B. Euler's theorem enables one to calculate this R-center for any type of displacement by means of perpendicular bisectors. R-centers of rotation for the lumbar spine are distributed throughout the entire region, indicating a constantly shifting center of rotation as the spine bends from left to right.

order to accomplish this, it is necessary to investigate the physical conditions which accompany the movement of vertebrae. Five x-rays are taken of a person in the anteroposterior plane: complete left bending (bending to left as far as subject can), midleft (bending to a point midway between first position and upright position), upright, midright, and complete right bending. Similarly, in the lateral plane, four x-rays are taken: full extension, upright, midflexion, and complete flexion. Midextension is eliminated because of the small amount of motion between extension and upright. The symbols for these nine views are L, mL, U, mR, R, and E, U, mF, and F, respectively. In this article, we will concentrate on the analysis of the L, U, R, and E, U, and F views of the five lumbar vertebrae.

1.4 • In this text, the symbol A1-2 refers to the anteroposterior view of the displacement of the first lumbar vertebra with respect to the second. A2-3 refers to the anteroposterior view of the second lumbar vertebra with respect to the third, and so on for A3-4 and A4-5. A similar meaning is attached for the symbols L1-2, L2-3, L3-4, and L4-5, where L stands for the lateral view of the same five lumbar vertebrae.

We have described eight displacements in order to have an over-all view of the lumbar region of the spine. This does not describe the total kinematics of the lumbar region, however, since it includes only the motion of the spinal region in two vertical planes perpendicular to each other: the anteroposterior and lateral planes. There also exists the horizontal plane with its vertical axis through the length of the spine. This plane would describe axial rotation of the spinal vertebrae with respect to each other, but this is very difficult to obtain for simple x-ray analysis. A method is being considered that might measure this motion, which would provide a complete description of the total displacement in three planes of space. In the meantime, the lateral and anteroposterior planes give useful and significant information independent of the horizontal plane.

1.5 • Focusing our attention on the anteroposterior plane, motion is considered in three steps: L-U (left-upright), U-R (upright-right), and L-R (left-right). Taking A1-2 as an example, this means that we will investigate the displacement of the first vertebra with respect to the second as it moves from the left position into the upright (yielding one R-center); as it moves from the upright into the right (producing a second R-center); and finally, the total motion from the left into the right in one step (which produces a third R-center) (Fig. 2A). It is thus seen that there are three R-centers for each complete articulation. Since there are four complete articulations (A1-2, A2-3, A3-4, and A4-5), a total of twelve R-centers are produced in this plane (Fig. 2B).

1.6 • In studying the R-centers of a number of subjects it was observed that there were three distinct types of arrangement among these points (Fig. 3). In one type, the L-U center appears on the left, and the U-R appears on the right side of the vertebral column. In the second type, the L-U appears on the right and the U-R on the left. Third, in some cases, L-U and U-R practically coincide. In almost all instances of these three cases the L-R point lies somewhere between the L-U and U-R points. Upon considering what type of a situation would most likely produce these results, we studied the nature of the intervertebral disk and examined what types of motion are possible between two vertebrae separated by a disk which acts as the region of contact.

1.7 • According to earlier studies by Hoag and Rosenberg,[2] the forces of thrust between the vertebrae are transmitted almost entirely from vertebral body to vertebral body directly through the intervertebral disk, except in the case of extreme extension when the spinous processes touch each other. This means that for whatever rotations do occur between vertebrae, the actual points of contact must lie somewhere within the intervertebral region. If the recorded R-centers do not lie within that region, there must have occurred, in addition to a simple rotation, some linear displacements within the intervertebral region, in order to produce the effect of a single rotation about a center outside of the intervertebral region. This is indeed what Euler's theorem signifies. We therefore began to investigate the types of motion responsible for R-centers as a function of the intervertebral region alone.

This observation of the physical conditions of motion immediately disclosed that the three types of R-center arrangements discussed above could be explained simply (Fig. 4). Consider the first lumbar vertebra to start its motion from its L (left) position. This means that the first vertebra normally begins at an angle with respect to the second vertebra; so that the left side of the first vertebra's lower surface is close to the upper surface of the second vertebra (that is, the point of closest approach), and the right side of the first vertebra's lower surface is separated further from the second vertebra.

From this L position the first vertebra can rotate into the U position in three distinct ways. It can

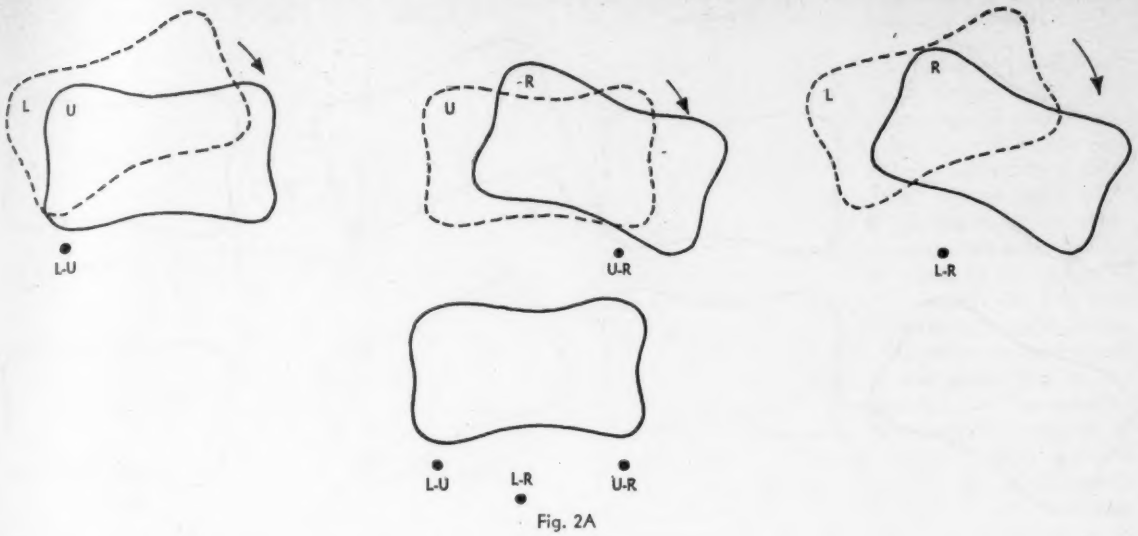

Fig. 2A

Fig. 2. Each vertebra has three R-centers, representing the motion from left to upright (L-U), upright to right (U-R), and the total combined rotation of both, from left to right (L-R). See Figure 2A above and Figure 2B at right.

move into the U position by dropping the right corner point of its lower surface, keeping its left corner point fixed. This means that the center of rotation for L-U occurs at the left side of the vertebra. It can also move into U position by raising its left corner and keeping its right corner fixed. This brings the L-U center of rotation to the right of the vertebra. Finally, the first vertebra can move into U position by a combination of these two; that is, it can both drop its right corner point and raise its left corner point. This means that the L-U rotation center appears in the middle or somewhere between the left and right sides of the vertebra.

1.8 • It is obvious that these centers must lie in the intervertebral region because these centers are always formed by the linkage between two vertebrae, and they represent either the actual centers of rotation or the *average* centers of rotation. However, this average center of rotation must not be confused with the R-center point of rotation which is an *equivalent* center. The R-center equivalent point is a *fictional* center of rotation (occurring much of the time outside of the intervertebral region) because it represents the combined effect of rotation *and* translation between two vertebrae. Even if an R-center is found to lie in one place continually (that is, if L-U, U-R, and L-R R-centers coincide) as the person bends all

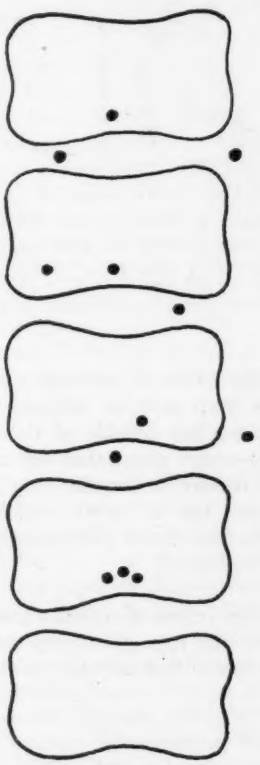

Fig. 2B

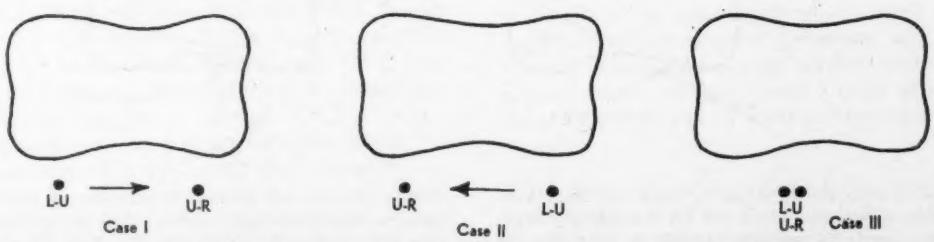

Fig. 3. An illustration of the three types of R-center distribution: movement of center to the right, to the left, and no movement.

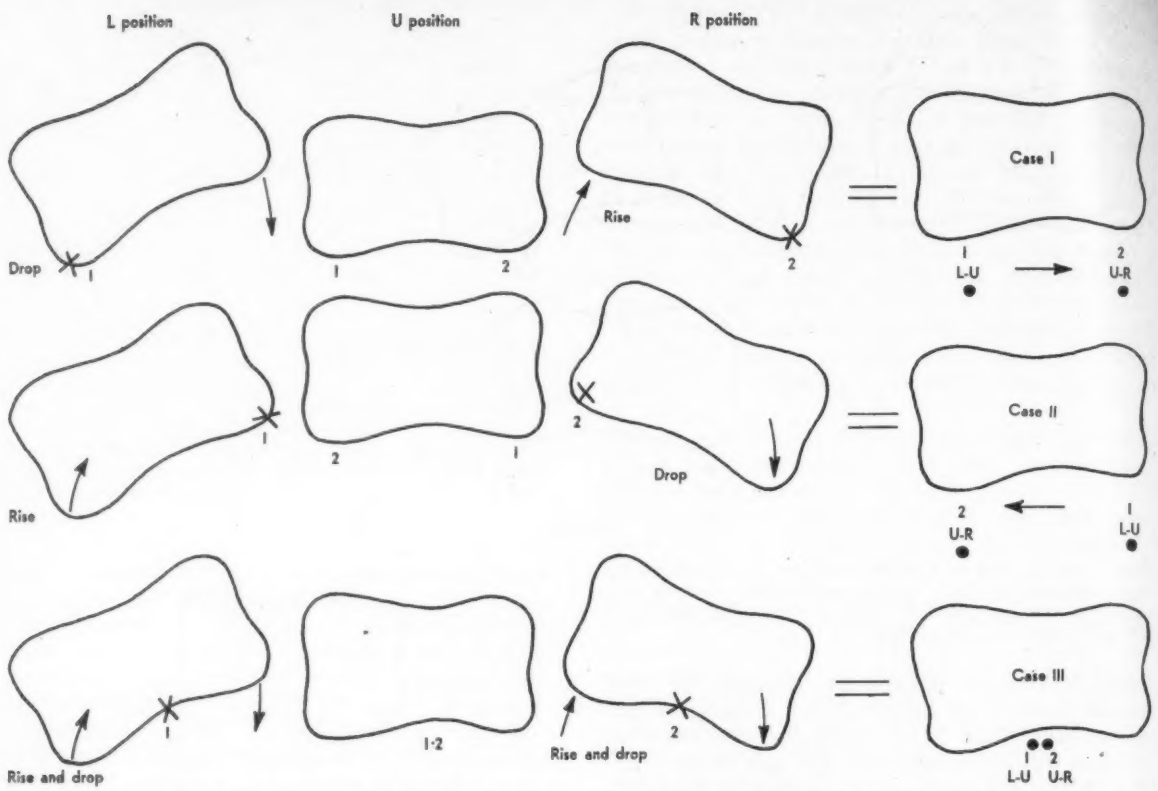

Fig. 4. The mechanism of the three cases of R-center distribution is divided into: Case I, in which the upright position is produced by a rotation of the right side down, thus making the first pivot point or center on the left side; Case II, in which the upright position is produced by a rotation of the left side up, thus making the first pivot or center on the right side; and Case III, where the upright position is produced by a combination of the first two cases. Thus the right side is brought down as the left side is brought up, producing the first pivot point near the center.

the way from the left to the extreme right, this would not indicate a pure rotation without translation as long as that point lies outside of the intervertebral region. Any R-center point that lies outside of the intervertebral region is therefore an indication of impure rotation, that is, rotation within the intervertebral region plus linear displacement within the intervertebral region.

1.9 • The average center of rotation always lies within the intervertebral region and represents the average point of rotation that actually existed within the intervertebral region during a rotation. Indeed, by taking a very small rotation and measuring the intersection point that is formed by the initial position of the lower surface of the first vertebra and its final position, a good approximation of the actual point of rotation during motion is obtained (Fig. 5). (If the infinitesimal rotations could be measured, the average center of rotation obtained would coincide with the actual point.) Thus the problem is to consider reasonably small rotations, and from these rotations determine their angles and approximate centers of rotation.

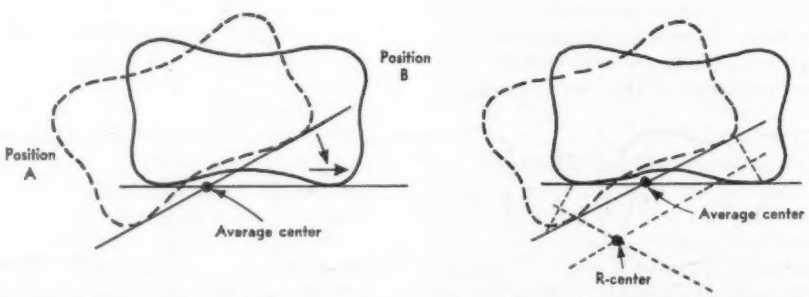

Fig. 5. If the vertebra merely rotates in place and there is no translation, then the average center and the R-center are identical. However, should the vertebra translate as it rotates, the R-center will appear either above or below the average center. Position A goes into position B by means of a rotation and a positive translation to the right. When perpendicular bisectors are constructed, the R-center appears below the average center. A negative translation to the left brings the R-center above.

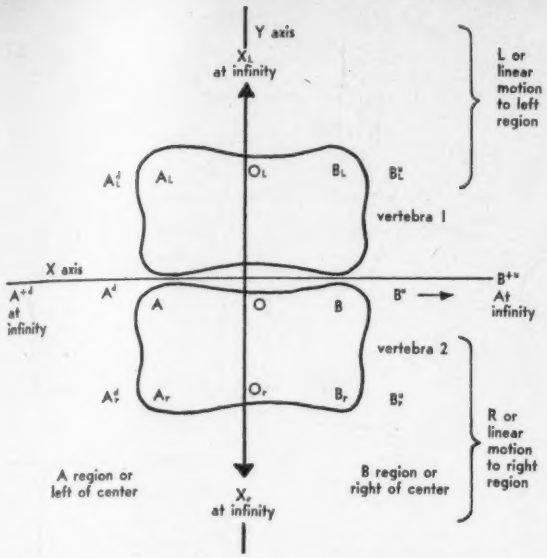

Fig. 6. Coordinate system for R-center location, classifying motion of the first lumbar vertebra with respect to the second. The X axis represents the location of the average center of rotation, employing symbols A, O, and B. The Y axis represents any translation that might accompany rotation, employing symbols l, o, and r. Variations on these symbols are explained in text. Thus, any movement of vertebra 1 with respect to vertebra 2 involving both a rotation and a translation can be represented in this plane mapped out by the X and Y axes. Every R-center represents a point on the XY *plane* and can be analyzed in terms of rotation and translation.

1.10 • It is thus seen to be possible to interpret the significance of the location of R-center points. What remains is to (1) give a description of this analysis so that a complete physical explanation can be given for any type of R-center distribution in terms of the intervertebral region, and (2) devise a means for measuring the two components of motion within the intervertebral region, that is, the *angle of rotation* about the average center (not the fictional R-center), and the *amount of linear displacement* that accompanies this rotation.

2. Analysis of the R-center distribution

2.1 • In order to interpret the distribution of the R-centers, we have constructed a coordinate system which will serve as a frame of reference for the location of the various centers. Since the motion of one vertebra is always considered with respect to its adjacent lower vertebra, we shall place our frame of reference on the lower one and view the motion of the upper vertebra in relation to this fixed coordinate system. Figure 6 shows how the Y and X axes are constructed, so that the X axis runs horizontally across the top of the fixed vertebra and the Y axis cuts vertically through the center of the same vertebra. The intersection is labeled "O" for origin. These two axes serve as a means of determining the two components of motion that each R-center expresses: The X axis (representing the intervertebral region because it lies in the region of contact between the two vertebrae) will be shown to indicate the nature of rotation, and the Y axis will be an indicator of the nature of translation.

2.2 • Whenever an R-center appears well to the left side of the origin, this R-center is due to the right side of the moving vertebra having rotated downward (Fig. 4). All centers that lie well to the left partake of a rotation that is characterized by a relatively large downward motion of the right side. Similarly, all centers that lie to the right are characterized by motions that bring the left side up. An R-center that lies on or very close to the origin is characterized by a rotation in which the left side is brought up while the right side is brought down, hence neutralizing an over-all upward or downward motion. Of course, there are also points that lie between the left side of the vertebra and the middle: however, for these cases, the downward motion of the right side is still greater than the small upward motion of the left side. We will call all R-centers that appear on the left side of the X axis A points, and on the right side, B points (and all points on or near the origin, O points).

It is thus obvious that the further a center is away from the origin in the left direction, the greater the downward motion of the right side of the vertebra. If the R-center lies on the X axis but is so far to the left that it appears entirely outside the vertebral column, a rotation has occurred in which not only the right side moves down, but the left side also moves down (Fig. 7). In effect, this is a rotation that involves a complete vertical motion downward within the intervertebral region. This means that *no* point within the intervertebral junction serves as an actual pivot of rotation, but that the whole upper vertebra moves downward in such a way that the right side moves down more than the left side. This produces an effect of rotation about a point outside the intervertebral region. We call this extended rotation (a rotation whose center point is located beyond the intervertebral region).

Finally, one can consider the limiting case of this extended rotation. This occurs when the R-center is so far out to the left that it fails to show on the paper at all (Fig. 7). The R-center is said to be at "infinity." In this case, the upper vertebra partakes of a pure downward (vertical) motion, with both the left and right sides moving down in equal amounts. The same analysis holds for the right side, when right extended rotation occurs, and the limit of this right extended rotation which would produce a pure upward motion. The symbols for extended rotation are A^d for the left extended rotation and B^u for right extended rotation. The symbols B^{+u} and A^{+d} are used to denote the rare cases in which the points lie so far out that they produce a motion indistinguishable from pure upward or pure downward motion. We consider pure vertical motion to be a special case of rotation about a point at infinity. All these classifications of motion have been found to occur.

2.3 • Five regions are designated on the X axis for the appearance of an R-center point: A^d, A, O, B, and B^u. In addition, however, further account must

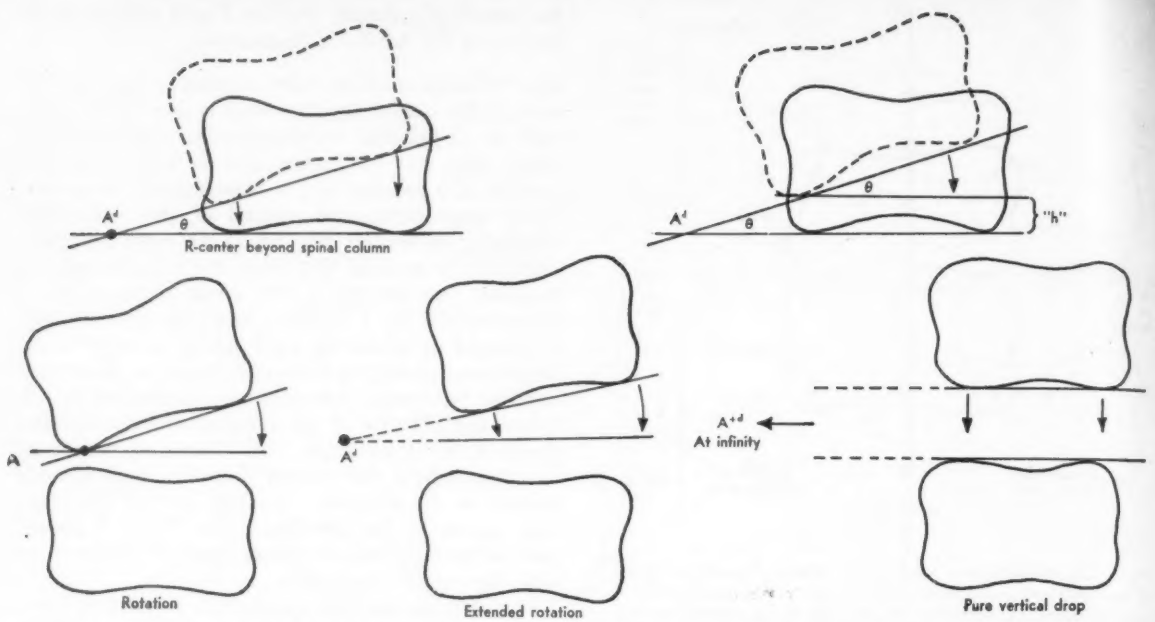

Fig. 7. "Extended rotation" occurs when the average center of rotation does not occur within the spinal column. Thus, for example, the entire vertebra can move down, so that the right side moves further down than the left side. This means that the vertebra in effect rotated clockwise an angle "Θ" and moved vertically downward a distance "h." We have arranged a sequence of three terms: A, A^d, $A+^d$. A represents pure rotation, in which only the right side moves down. A^d represents extended rotation, in which the right side moves down to a large degree, but the left side also, to a lesser degree. Finally, in the limit, $A+^d$ would represent pure vertical motion, that is, the right and left sides move down equal amounts.

be taken of the possibility of there being no relative rotation between the vertebrae at all, when the spinal column moves from left to right or from extension to flexion. This situation is denoted by the symbol X. Therefore, each relative displacement between two vertebrae can be represented by six symbols: A^d, A, O, B, B^u, and X. If the displacement of vertebrae in moving from left to right is considered in two component steps—from L-U to U-R—each component can have six possible values. Hence, the entire displacement is represented by a combination of two symbols, each symbol having six possible values. This means that the number of possible combinations representing the total displacement is 36, since the six possibilities of the first symbol can combine with the six possibilities of the second symbol, yielding 6 times 6 combinations.

2.4 • These 36 combinations can be classified into three major groups. Case I is called the A-B group. This group represents all shifts of the R-center from left to right. Case II is called the inverse or B-A group. In this case the R-center shifts from the right to the left as the person bends from left to right. Finally, Case III is called the O group, denoting that group in which the two R-centers coincide and do not shift as the person bends from left to right (Figs. 3 and 4).

2.5 • A possible explanation for these groupings is as follows: Case I could be explained on the assumption that the nucleus pulposus within the disk is ineffectually small or has broken down, and hence allows the vertebra to pivot about the edge of the vertebra as the vertebra moves from left to right. Case II could be explained by the assumption that a nucleus pulposus is sufficiently large but inelastic, so that the vertebra pivots on the pulposus without deforming it. Thus, the pulposus first appears on the right side and acts as a fulcrum to lift the left side; then when the weight shifts, the pulposus slips to the left side and acts as a pivot to allow the right side to move down. Finally, Case III could be explained in a manner similar to Case II, except that the pulposus remains more or less in one position, whether or not it is elastic and deformable. However, all these explanations are merely hypothetical as yet, and must be tested, even though they seem to be suggested very strongly by the types of motions performed by the vertebrae.

2.6 • The Y axis must be studied in a similar manner. As Figure 8 indicates, the R-centers appear on the X axis only when the vertebrae make no linear motions (that is, the motion is pure rotation). However, should there be a rotation accompanied with translation, the R-center is shifted either above or below the X axis. For instance, Figure 8 shows that a slight linear displacement to the right would bring the R-center below the X axis (even though the actual or average center appears within the intervertebral region). Similarly, a slight displacement to the left as the vertebra rotates would bring the R-center above the X axis. The greater the translatory displacement, the further removed the R-center would appear above or below the X axis. We have called the region below the X axis the R-region, and the region above the X axis the L-region (Fig. 6).

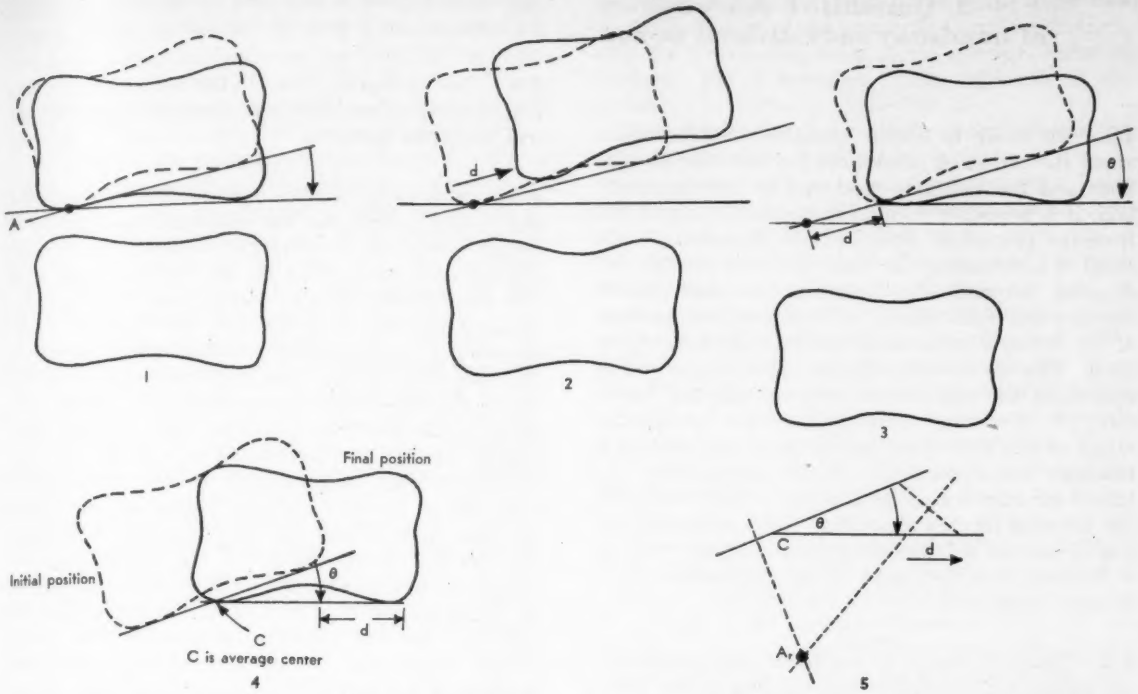

Fig. 8. The first figure represents pure rotation about a point A. The second and third figures represent a combined translation and rotation, broken up into two steps: First a translation by an amount "d," and then a rotation by an amount "θ." The total effect is represented in the fourth figure. Actually, the same result could be obtained by first rotating and then translating, or by a combination of both at the same time. By recording the location of the average center C, the angle of rotation "θ," and the linear displacement "d," it has theoretically been made possible to determine the location of one equivalent rotation about an R-center (see Figure 5). While it is important actually to measure the individual values of "θ," "d," and the location of C, their net effect can conveniently be summarized as one R-center. The coordinate system illustrated in Figure 6 can then be used to compare several such motions. It is not necessary actually to construct the R-center; merely knowing where C is on the X axis (A^a, A, O, B, B^u) and whether "d" is plus, zero, or negative (locating the translation as r, o, or l on the Y axis) is sufficient to indicate the general region in which one equivalent R-center would fall. In the particular example shown, the rotation occurs about a point on the left side of the vertebra, point A, and the translation is positive, that is, to the right. The coordinates of the R-center would be A for the X axis and r for the Y axis, and this R-center is called A_r.

If the R-center lies so far down that it could be considered at infinity, such an instance would mean that a pure horizontal displacement to the right, without rotation, had occurred. Similarly, a pure horizontal displacement to the left would bring the R-center point to infinity above the X axis. Using this same coordinate system, we have calculated the possible combinations for the various linear displacements. The Y axis has three regions: l, o, and r, with l standing for left linear displacement, o for no linear movement, and r for right linear movement. Since there are two movements to consider (L-U and U-R), each of which can be labeled l, o, or r, this means that each movement has three possibilities, resulting in 3 times 3 or 9 possible combinations for both movements together. Since the X axis gives us 36 distinct patterns or combinations, and the Y axis 9 patterns, together they yield 36 times 9 or 324 arrangements that are possible for the two R-center points (representing L-U and U-R) within the frame of reference described. It therefore is possible to classify each pair of points and describe what physical condition brought them into being in terms of the kinematics of the intervertebral region.

Figure 6 shows that the entire infinite plane mapped out by the X and Y axes is now accounted for, including the points at infinity at the four extremes of the axes. The infinite points on the X axis refer to pure vertical motion; the infinite points on the Y axis refer to pure horizontal motion; the origin refers to pure rotation; any other points on the X axis mean rotation with some vertical motion either upward or downward (see paragraph 2.2); any other points on the Y axis mean a rotation with a resultant horizontal shift; and all other points in the four quadrants are combinations of rotations, vertical linear motions, and horizontal linear motions.

2.7 • In extending the analysis, the L-R motion has an R-center point which describes the total bending from left to right in one motion. This one R-center point has 6 possible values on the X axis and 3 possible values on the Y axis, yielding 6 times 3 or 18 possible combinations for this L-R point. Since this L-R R-center point represents the entire motion of bending from left to right in one step, we consider it as an entity distinct from the L-U and U-R pair of points, which consider the same motion in two component steps.

3. Quantitative determination of translatory and rotational motion

3.1 • In order to obtain quantitative information about the orders of magnitude for both the translations and the rotations produced by vertebral motion, it is necessary to modify the mechanics of the R-center procedure described by Rosenberg.[1] Instead of constructing the Euler R-center directly, by drawing perpendicular bisectors, we shall merely measure the translational and rotational components of the R-center in terms of the intervertebral region itself. This method has distinct advantages: (1) it eliminates the construction of perpendicular bisectors; (2) it is more accurate, since the mechanical errors arising from the construction of perpendicular bisectors are eliminated; (3) the results thus obtained are more meaningful as they directly describe the physical process of motion in the intervertebral region, instead of indirectly indicating it by means of a fictional R-center point lying outside the intervertebral region.

3.2 • The first step is to use three x-ray negatives: one called left (complete side-bending to the left), one upright, and one right (complete side-bending to the right), taken in the anteroposterior plane. (From the lateral plane, three negatives are used for this step: one extension, one upright, and one flexion.) The upright negative is placed on top of a frosted glass on a viewing box, and three small holes are punched in each of the five lumbar vertebrae in a prescribed manner, with the point of a draftsman's divider. Two of these points mark off the two lateral edges of the lower surface of the vertebrae, and the third point is placed anywhere in the middle of the vertebral body. It is relatively simple to determine the lower edge of the vertebra by locating the point of greatest curvature and making the puncture at that point. In effect, the two lower points define the bottom surface of the vertebra, making the bottom surface a fixed line or frame of reference. It is the motion of this surface which is being investigated, relative to the vertebra which is immediately below it.

3.3 • It would be possible, of course, to investigate the motion of the lower vertebra with respect to the upper one, by punching holes on the top surface of the lower vertebra. However, in keeping with the convention of the previous project, intervertebral motion is studied using the lower vertebra as a fixed frame of reference from which movement is recorded by noticing the displacement of the upper vertebra relative to the lower one. The reason we pick the lower surface of the upper vertebra as the surface to record, instead of any other surface or plane in the upper vertebra, is that this surface makes contact with the intervertebral region and hence becomes the most useful and interesting from a dynamic point of view. Furthermore, the error in judgment involved in picking out the lower surface is well within the accuracy attainable by the matching method (that is, the error is less than 1 degree for rotation and 1 mm. for translation).

3.4 • The third point, lying in the body of the vertebra, is used as an additional point for matching, as will be shown later.

3.5 • After each vertebra is marked on the upright film in this fashion, the left side-bending negative is superimposed on the upright negative. Naturally, the two columns do not coincide, but the purpose of this superimposition is to match separately each individual vertebra from the left view with the corresponding vertebra of the marked upright negative, and then transfer the holes from each upright vertebra to the vertebra on the matched left negative. In other words, the three puncture holes in each individual vertebra are considered as a fixed structure of that vertebra, and we wish to have the identical construction of each vertebra appear on the corresponding view of that vertebra. Since the light from the viewbox clearly shows the holes in the upright negative when the left negative is placed on top of it, the point-end of a divider can easily be used to puncture the left negative at precisely the same points. Care must be taken to exactly match the outlines of the corresponding vertebra. This procedure is followed for each of the five vertebrae on the left side-bending films, and then on the right side-bending films.

3.6 • The relative motion of the vertebrae with respect to each other can be studied by means of recording the relative displacements of these holes that have been made a fixed part of the vertebrae. To study the displacement, place the negative of the upright position on the view box and tape a large sheet of tracing paper over it. The first step is to locate on the tracing paper the three sets of holes that appear on each of the five lumbar vertebrae by placing a divider point through the tracing paper straight into the holes in the upright negative below. Then, with the point of the dividers, make a thin scratch line through the lower two points of each vertebra on the tracing paper. This line defines the position of the lower surface of each vertebra in the upright position. The lines should be drawn to go through the reference points and beyond the actual confines of the vertebrae themselves. It is preferable to make the extension of these scratch lines large on the right side (where measurements will be recorded) and relatively small on the left side. After this has been done, a small red line (0.5 cm.) is superimposed upon the scratch line on the extreme right end. This serves to identify the upright scratch lines as red.

The left negative is placed over the tracing paper in such a way as to match the reference points of the second lumbar vertebra of the left view with the reference points of the second lumbar vertebra of the upright view which appear on the tracing paper below it. This is done by matching the three fixed holes on each corresponding vertebra. In this way, the second vertebra has been made the stationary

frame of reference. It will be noticed that while the second vertebrae match, the first ones do not, because of relative displacement produced by the subject bending to the left.

The pointed ends of the dividers are then pushed through the holes of the first lumbar vertebra of the left view onto the tracing paper underneath. Thus, the tracing paper will now have two sets of holes for the first vertebra: one for the upright, which has a scratch line through it, and one for the left-bending position. The holes of the view with side-bending to the left will be displaced with respect to the holes of the upright view on the tracing paper.

This procedure is then continued by matching the third lumbar vertebrae of the left-bending and upright positions together. The relative motion of the second vertebra with respect to the third can thereby be recorded on the tracing paper. This is continued until the four relative motions are recorded: L-1 with respect to L-2, L-2 with respect to L-3, L-3 with respect to L-4, and L-4 with respect to L-5. After all the points have been recorded on the tracing paper, the left side-bending x-ray negative is removed, and an outline of the vertebrae themselves is traced from the upright negative onto the tracing paper.

3.7 • We now make a scratch line through the sets of holes that have been made from the left-bending film onto the tracing paper, marking them with a small blue identification line on the extreme right end. In the analysis that follows the third point that lies in the center of each vertebra can be discarded, since it only served in the process of matching. We are therefore left with two intersecting lines for each of the four intervertebral regions (Fig. 9A).

3.8 • The tracing paper is now removed from the upright negative and is ready for quantitative analysis. In order to determine the angle the vertebrae moved through as they moved from the left-bending position to upright, a protractor is placed at the intersection point of the two scratch lines, and the angle between the lines is read. This intersection point is thus the average center of rotation discussed in paragraph 1.8. The angle is the actual angle that the lower surface of the vertebra has moved through, with the intersection point as the average center of rotation. This is recorded on the right side of the vertebrae, as shown in Figure 9B.

Next, the relative linear displacement between the two vertebrae is determined by taking a pair of dividers, placing one point on the intersection point (average center of rotation) of the two scratch lines, and the other point at the hole on the right side of the vertebra's left-bending (blue marked) scratch line. From this position, the dividers are used to make an arc with its center at the intersection of the two scratch lines, and swinging the other end of the dividers until it reaches the red scratch line (Fig. 9B). When the arc has reached the red scratch line, a point is formed which may or may not coincide with the right hole of the red scratch line, which represents the right edge of the lower surface of the vertebra in its upright position. If the points do coincide, a condition of pure rotation without any effective translatory displacement is indicated, because the dividers have merely brought the right edge of the lower surface from its left (blue) position into its upright (red) position. However, when the arc has been swung by the dividers, it may be that the new intersection point on the red scratch line does not coincide with the right point of the upright position. The right point may be found to be closer to the average center of rotation or, as in Figure 9B, further removed from it. If the right point on the red scratch line is further removed from the new intersection point, there will be a small but definite segment of length on the red scratch line between the new intersection point and the right point of the upright position (marked "d" in Figure 9B).

This small segment, when measured, represents the amount of linear displacement or translation that has occurred to the right, as the vertebra moved from its left-bending position into its upright position. In effect, we will be measuring the line segment "d" indicated in Figure 8. Similarly, if the right point on the red scratch line is closer to the average center of rotation than the new intersection point, it means that there has been a shift or linear displace-

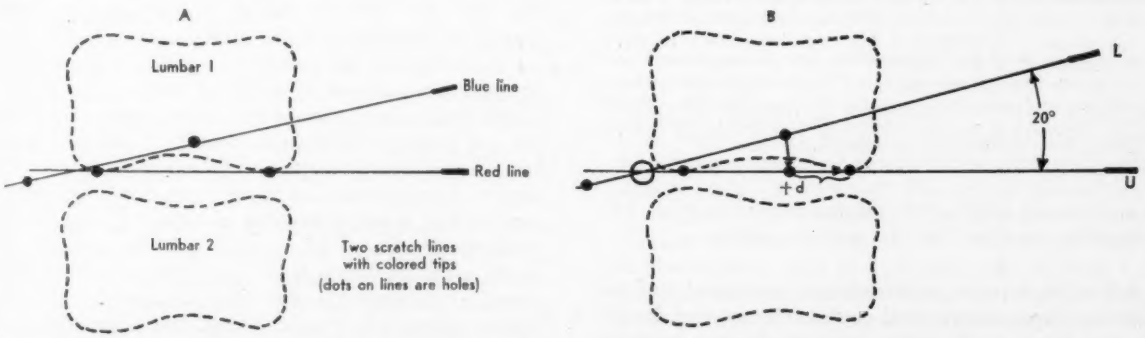

Fig. 9. Lumbar vertebrae 1 and 2 are in upright position, traced on tracing paper. There are two scratch lines: one with a blue segment, and the other with a red one. The blue segment indicates the former position of the first lumbar vertebra when it was in its left position, and the red segment indicates its present upright position. The two holes on each scratch line mark the length of the lower surface of the moving top vertebra. In the second figure, the two scratch lines intersect, and their intersection, which is marked by a circle, represents the average center. The value of "d" is obtained by swinging an arc around the average center, bringing the holes on the blue line onto the red line. Finally, the angle "Θ" can be measured using the average center as vertex.

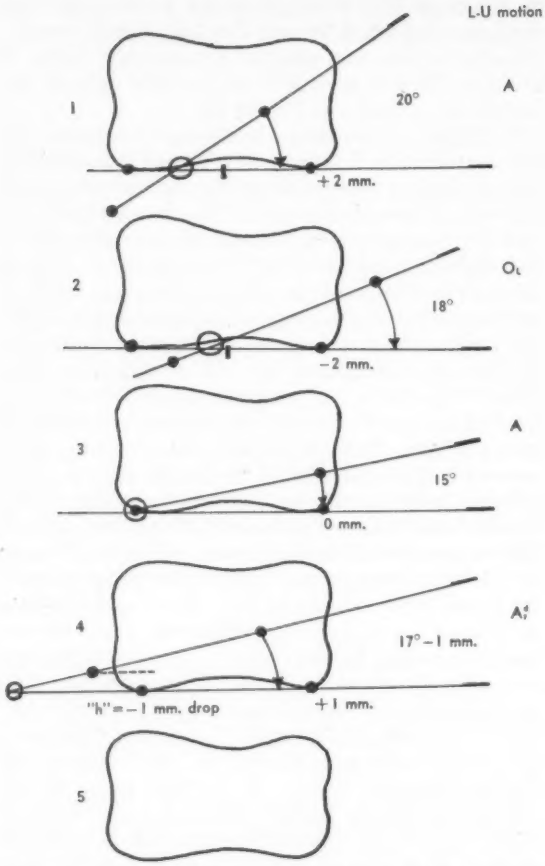

Fig. 10. An example of a complete lumbar spinal column, as it swung from its left position into its upright position. The motion of the first with respect to the second yields an angle of 20 degrees and a displacement of plus 2 mm. The average center is to the left side; hence the R-center has coordinates A and r, and is called A_r. In the motion of the second vertebra with respect to the third, the average center is very close to the center, and is called O. The displacement is negative, to the left. R-center is called O_L. (If the average center is less than one third of the distance from the center to the edge of the vertebra, it is called O; otherwise it is called A. In the first two cases the center is indicated by a small mark.) In the motion of the third vertebra with respect to the fourth, the average center is clearly A, and there is no translation; hence the R-center is A. In the motion of the fourth with respect to the fifth, the average center is considerably to the left, in position A^d. There is a positive translation or slippage r. The R-center is A_r^d. In recording the angle made, 17 degrees, it is also indicated that the vertebra moved down 1 mm; the angle is recorded as (17° — 1 mm.). In this particular example, no R-center was located at the B or right side, although this occurs in L-U and U-R motions. The upright to right motion of this spinal column would probably reveal these.

ment to the left, as the vertebra moved from its left-bending position into its upright position.

3.9 • This type of measurement is continued, and the linear displacements and angles are recorded for the entire four sets of motions between the five vertebrae (Fig. 10). Sometimes it is necessary to record not only a linear displacement to the left or right, but also a vertical rise or drop. This is done by measuring the perpendicular distance for the edge-point of the upright vertebra to the point where this perpendicular distance intersects the left (blue) scratch line. In effect, we are measuring the distance called "h" in Figures 7 and 10. Thus, we now have a numerical value for the angle of rotation, the amount of linear displacement relative to the intervertebral region, and the amount of rise or drop relative to the intervertebral region.

After finishing the L-U movement, in which the angles and translations that arise because of motion of the vertebral column from left-bending to upright were studied, the next step is to study the U-R motion in an exactly analogous manner. In this case, the U negative is tacked down again, and this time the R negative is superimposed on it instead of the L. The only difference is that the R-negative scratch line has a green coding to distinguish it from the others.

Finally, after completing both the L-U and the U-R motions, we study the net over-all motion called the L-R. In this analysis, we start by placing the R negative on the bottom and study the L negative relative to the R negative. Upon finishing this last study, we have on one large sheet of tracing paper all three motions for the anteroposterior view: the L-U, the U-R, and the L-R.

In a similar way, we construct the lateral views of E-U, U-F, and E-F. At the end of the entire process, we have six drawings representing the six steps under consideration when a vertebral column moves from left-bending to right-bending, and from extension to flexion: three for the anteroposterior motion and three for the lateral motion.

3.10 • Having at hand the drawings of these relative displacements, together with their numerical values, one can observe where the rotation has been large, where peculiar translational shifts or rises have taken place, and where the average point of rotation lies in relation to the intervertebral region.

3.11 • We have utilized the above procedure of analysis for more than 70 cases, recording numerical values for rotation and linear displacement. To evaluate the results of this analysis, we classify the various numerical values into several groups—such as the A-B, the B-A, or the O groups—and the 324 groups of possible R-center arrangements. With such an evaluation of the numerical results, it is possible to ascertain patterns of vertebral motion that might characterize the motion of the spinal region. To date, we are finding that the intervertebral motions tend to occur in certain patterns. Of course, in order to arrive at a significant set of patterns, it will be necessary to test a larger number of cases. If significant patterns are found to exist, it will be possible to study cases in which there are deviations from the standard patterns. In this way we may be able to obtain some information about the abnormal behavior of spinal motion.

[*To be concluded in the August* JOURNAL]

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2. Hoag, J. M., and Rosenberg, P.: Physics of intervertebral disk. J. Am. Osteop. A. 52:326-334, Feb. 1953; 52:386-390, March 1953.

Cancer and cryotherapy
A review

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"The dying cancer patient," says Howes,[1] "condemned before his doctor's pessimism, is torn between the twin sirens of charlatanism and morphinism." Depression caused by the knowledge of imminent death followed by increasing debility and helplessness is deepened by the continuous agony of intractable pain. Ulcerations, infections, constipation or diarrhea, cough, anorexia, or vomiting may add to the misery.

A search of the literature to find some way of providing more relief for the patient in the terminal stages of malignancy added little knowledge to the supportive measures currently in use. There was one exception.

It would be more correct to say that there was a series of related exceptions. Approximately 20 years ago Temple Fay and Lawrence Smith wrote several articles reporting their success with what the newspapers called "frozen sleep." In at least ten articles over a 5-year period these authors extolled the value of cryotherapy in cancer.

A surprisingly great number of famous names in medicine are linked with the use of ice or snow or some form of cold as actual therapy. Hippocrates recommended the use of snow or ice to check hemorrhage and for swellings. For gouty joints and sprains he recommended the copious use of cold water.[2,3] Celsus advised use of cold water on recent injuries of the most varied kind.[2] William Harvey treated his own gout as Hippocrates had suggested. Bartholin recorded that Severino (father of comparative anatomy) used ice and snow for sprains and swellings. Francis Bacon caught his death of cold while trying to preserve meat. William Cullen and John Hunter both unsuccessfully attempted to induce suspended animation in animals.[3] Baron Larre, Napoleon's army surgeon, reported that cold had an anesthetic effect.[4,5] Louis Pasteur studied the effects of cold on resistance to infections in birds.[6]

With the possible exception of the use of cold for swelling as advocated by Hippocrates, the first recorded use of local cooling for cancer was published in England by James Arnott (1848) in an article entitled, "Use of very low and benumbing temperature in Cancer, Neuralgia, Rheumatism, etc."[7] He devised special containers and applicators for his ice-cold brine solutions. In the next year Bennett wrote "On cancerous and canceroid growth," a paper which advocated use of cold saline solution for breast tumors. Valpeau in France used ice, but only after Arnott had visited him.[7] The specific action of cold was described by Cooke[8] in 1864 when he wrote:

> Cold, by means of ice applied with great caution, has its uses. It subsides those occasional inflammatory paroxysms to which scirrhous tumor is prone, and may check the disposition to suppuration, the result of inflammatory action. Its constant use, however, in all states of the tumor is not warranted by experience. The destructive power of the agent is so great, that I have seen the whole breast slough as a result of the prolonged application of ice, and the sloughing, in the instance I refer to, extended through the intercostal muscles into the cavity of the chest.

Further work in cancer was done by Paul Ehrlich[9] when he discovered that extreme cold would preserve the viability of transplantable tumor tssue. In 1936 Huggins and Noonan[10] established that a critical temperature is necessary for normal embryonal cells to grow. Embryonal cells are undifferentiated. In the same year Geschickter and Copeland[11] reported that metastases from tumors were found chiefly in the warmer parts of the body, and in 1938 Fay and Henny[12] confirmed and amplified their findings. In the next year, Smith and Fay[13] demonstrated that developmental defects could be induced in chickens if the eggs were incubated for the first 48 to 72 hours at 90 F (32.2 C) instead of the normal 101 F (38.3 C), thus confirming the work of Huggins and Noonan.[10]

The monumental work of Fay, Smith, and their

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Prolonged refrigeration diminishes the size of the malignant colony without damage to normal tissues . . . Hypothermia is analgesic in action, and the intractable pain of cancer may be relieved for long periods

associates[13,15-24] provides the only hope for the cancer patient who has been rejected because he has had a full course of radiation and complete extirpative surgery.

In 1941 a comprehensive summary by Talbott[8] reviewed the work in hypothermia up to that time. In this review in *The New England Journal of Medicine,* he summarized:

> A discussion of hypothermia is timely because the physiological changes and therapeutic implications associated with it have begun to be studied systematically only of late. During general hypothermia the internal body temperature may be lowered to 75° F. with subsequent recovery. It may be maintained continuously between 80 and 90° F. for as long as eight days. If local application of cold is employed, a circumscribed area of the body may be maintained between 40 and 50° F. for several months without damage or destruction of normal tissues. Relief of pain is probably the most important single effect of general hypothermia in patients with metastatic cancer. Regressive changes in tumor tissue have been reported following prolonged general hypothermia.

He concludes "that knowledge in the field of hypothermia is most fragmentary and that until a large amount of painstaking labor is expended, a full and comprehensive understanding of all the related facts will not exist." In the last 5 years there has been an increasing volume of research on the physiology of hypothermia particularly as an anesthetic aid. For a complete summary of recent work the reader is referred to an article in the *British Journal of Anaesthesia*[3] or to the book *The Physiology of Induced Hypothermia.*[14]

Fay and Smith reported that in their studies of almost 200 terminal cases (all patients had previously been treated by the conventional methods and now were seeking relief from severe pain) neurosurgical intervention for the relief of pain was no longer required after one or more periods of generalized body cooling. They further reported that in many instances actual regression of the primary and often the metastatic cancer occurred. McCravey[25] reported similar finding when he treated cancer of the urinary bladder with local cold applications using specially designed applicators. In addition to the cancericidal and analgesic effects a third property was noted. Many of their patients were morphine addicts. Fay and Smith reported that after a series of treatments the pain was often gone for 2 or 3 months, and that the drug addiction was gone also.[15-24]

In 1942 Sano and Smith[20] reported on experiments with tissue cultures. They found that temperatures of 22 to 24 C were critical with respect to nuclear division of tumor cells. Only rarely would tumor cells survive 5 days at 20 C. A large proportion of tumor cells grown at 22 to 24 C showed arrested, incomplete mitosis.[19,20]

Partly as a result of World War II, work previously done with reduced temperatures lay buried on library shelves until May 1950 when Boerema[26,27] of Amsterdam reported on the successful use of hypothermia as an aid to cardiac surgery. Bigelow[28,29] in America reported similar findings at about the same time. These papers stimulated a resurgence of research concerning induced lowered body temperatures. But the effect of cold temperatures on cancer, malignant cell growth, and metastasis has had only rare and sporadic study since the work of Smith and Fay.

In 1930 Lortat-Jacob and Solente[30] reviewed their own experiences and those of 300 authors in the use of cryotherapy. Local freezing was used in cancer therapy for skin lesions, especially basal cell carcinoma and in selected cases of squamous carcinoma.

In a tissue culture of He La gray cells, Newton and Wildy (1954)[31] reported that cooling for 1 hour at 4 C produced:

1. Inhibition of cellular division
2. Synchronous division of cells occurring about 18 hours after cooling
3. Synchronism persisting for at least two divisions.

This effect of refrigeration on tissue cultures was similar to that reported by Sano and Smith[20] in 1942 when they advocated the trial of x-rays plus cooling. No report has been made of such an experiment nor has the synchronizing effect of cold on mitosis been studied *in vivo.*

The literature has become filled with examples of the safety of hypothermia since its use has become common in cardiovascular and neurologic operations. Examples will be cited to demonstrate the extremes which are compatible with human life.

Niazi and Lewis (1958)[32] reported reducing the temperature of a 51-year-old woman in the last stages of carcinomatosis to 9 C. They reported that cardiac standstill persisted for 45 minutes. Upon rewarming, the patient was "pleasant and alert" and "remembered our names immediately after recovery." They reported that there was no change in her cancerous condition and that she died 38 days later of ureteral obstruction. Of course their work did not meet the time requirements set forth by Smith and Fay[13] who believed that at least 5 days of subcritical temperatures were necessary before definite regressive changes in the tumor would be evident.

Refrigeration but not true hypothermia has been maintained continuously in critically ill patients for as long as 42 days, with survival, by Reeves and Lewis.[33] Hypothermia has been used in pediatric cases for asphyxia, hyperpyrexia, and various opera-

tions in the Los Angeles Children's Hospital.[34,35] It has been also advocated for aged persons who must undergo operations for various reasons, who have poor respiratory or cardiovascular function.[36] In England hypothermia has been safely used to treat conditions occurring during pregnancy such as eclampsia or severe neurologic injury without harm to the unborn fetus.[37-40]

A cannula registering −20 C was inserted into areas of cerebral cancer by Rowbotham (1957).[41] None of the four patients died from the procedure, and relief was obtained in two. Smith and Fay[21] reported a similar experiment, but not at such low temperatures.

The success of hypothermia in the treatment of cancer is dependent on the temperature and the time of exposure. Vaughn,[42] a contemporary of Smith and Fay, reported failure to reproduce the results of the two investigators from Temple University Medical School. He said that hypothermia was dangerous, causing cardiac and lung complications which led to the death of the patients, and that it was not effective in diminishing the size of the tumor. He reported, however, that pain was often dramatically reduced after treatment. Analysis of his work demonstrated that he failed because of the time element. He cooled his patients for not more than 36 hours, whereas Fay believed that temperatures of 85 to 90 F (29 to 32 C) were necessary for about 5 days before regressive changes occurred. In many cases intermittent periods of over 300 hours were given by Fay and Smith. The same criticism can be made of the work of Niazi and Lewis,[32] although their work stands as a "record" in depth of human refrigeration.

Some of the most exciting discoveries in cancer have been made with animal experimentation and transplantable tumors. The reports are too voluminous to survey in this brief paper. It is of more than passing interest that the work done by Ehrlich (1907)[9] and later by Breedis and Furth (1938)[43] showed that mouse sarcomas and carcinomas could be kept for over 1 year at low temperatures (−10 to −79 C) without losing the power to start fresh tumors. In 1949 Gye and his associates[44] presented evidence that the refrigerated cells were really dead, but that the reproducible tumor was the effect of an agent that survived the rigors of severe, rapid cooling which killed the agent's host cell. They concluded that cancer in mice, as a pathologic process, "is the effect of the parasitization of a cell with a specific virus." The relation of viruses to many animal cancers is irrefutable. This relationship apparently does not exist to the same degree in human cancers.

There is an ever-increasing list of transplantable animal tumors. However, there is no record of a malignant tumor being transferred from one man to another, accidentally or otherwise. Medewar[45] stated the problem in another way: "Nearly everyone who supposed he was using transplantation to study tumors was in fact using tumors to study transplantation—not always to good effect."

Unfortunately, Smith and Fay did not classify their results as to which tumors appeared to respond more favorably to the cold treatment. They only provided lists of which tumors were treated. Theoretically, from the available data, it would appear that tumors induced by viruses could not be cured by cryotherapy, although conceivably their multiplication could be retarded by sufficiently low temperatures. On the other hand, the reports cited above indicate that local or general hypothermia has a destructive effect on undifferentiated and at least some types of malignant cells, but not normal cells. All cells can be destroyed by various physical means, with extremes of heat, cold, or irradiation. The effect of cold in diminishing the size of the tumor presupposes, as Smith has suggested, that there is a critical temperature for tumor cells which is different for noncancerous cells. Prolonged exposure of the body to the temperatures just below the critical level for cancer tissue, but just above the range for normal tissue, would allow the body to rid itself of the malignant tissue. Operation would effectively reduce the time necessary for hypothermia, since the greater mass of cancer tissue could be more easily removed manually, leaving the distant and grossly invisible sites to be gradually destroyed by the subcritical temperatures.

In institutions with equipment and trained personnel to handle hypothermia, comprehensive study based on the work of Smith and Fay should be undertaken in the chance that greater relief can be given the terminal cancer patient

Theory is only useful when put to the test. The intricacies of the human body are so numerous and so mysterious that theory and reasoning alone will often lead down a false path. In experimentation rests the burden of proof.

The differences between animals and man cast doubt upon the applicability of some experimental animal data to man. Black and Speer (1959)[46] suggest "it would be more profitable, not to study mice less, but to study man more."

Summary

The terminal cancer patient is given up as lost by his doctor, his friends, and himself since there is no curative drug, operation, or irradiation presently available which will stop the spread of malignancy. A search of the literature has revealed hypothermia as one possible hope for these "incurables." Cold therapy has been advocated and used from the time of Hippocrates to the present. Hypothermia, both locally and generally, is a proved and safe addition

to the physician's armamentarium.

Findings reported in the literature which indicate the value of hypothermia in cancer are:

1. Embryonal and undifferentiated neoplastic tissues have higher critical temperatures necessary for growth than differentiated cells.

2. Prolonged refrigeration diminishes the size of the malignant colony without damage to the normal tissues.

3. Hypothermia is analgesic in action, and the intractable pain of cancer may be relieved for long periods.

4. Drug addiction disappears after treatment.

In institutions with equipment and trained personnel to handle hypothermia, comprehensive study based on the work of Smith and Fay should be undertaken in the chance that greater relief can be given the terminal cancer patient.

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I wish to express appreciation to Professor I. Boerema who not only made his facilities available, but engenders a contagious spirit for research, and to Professor Vermeulen-Cranch, who summarized that the next chapter will be investigation.

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Surgical treatment of spontaneous intracerebral hemorrhage Observations on 80 cases*

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Spontaneous intracerebral hemorrhage creates a pathologic syndrome often referred to as "stroke." This condition can also be produced by cerebral thrombosis or cerebral embolism. The neuropathology is created by the localized destruction of cerebral tissue, whether it be by an expanding hematoma or by the localized ischemia of cerebral thrombosis and embolism. Apoplexy is not strictly a disease, but a group of symptoms that are manifested by patients with a degenerative vascular process.

Cerebral apoplexy or "stroke" is the commonest and most serious acute neurologic disorder.[1] It is the third most common medical cause of death, according to the Metropolitan Life Insurance Company.[2] From this may be seen the importance of the problem.

At the present time direct surgical attack on the "stroke lesion" is indicated only when the syndrome is produced by intracerebral hematoma, with one exception. Thrombosis and embolism produce necrosis and softening of cerebral tissue, but little is accomplished by removal of this degenerated brain substance unless the softening produces pseudotumor reaction and behaves like a space-occupying lesion. Sympathectomy, by reducing cerebral spasm and improving collateral circulation, may help in selected cases of thrombosis.

When hematoma occurs, a space-occupying lesion is produced, which is the indication for surgical intervention. The mortality of spontaneous intracerebral hematoma with nonoperative treatment varies between 80 and 95 per cent in any large series.[3] The rationale of surgical treatment for spontaneous intracerebral hematoma is based on removing a space-occupying lesion and reducing intracranial pressure on important cerebral structures. By lessening the size of the hematoma, which is a foreign body, the inflammatory response is also diminished. The hoped-for result is to spare the life of many patients who would die without surgical treatment and to lessen the neurologic deficit in those patients who might survive with nonoperative treatment.

In this series of 80 cases, spontaneous intracerebral hematoma was defined as "a pathologic cerebrovascular condition producing a syndrome of stroke in which the etiologic mechanisms for the hematoma were without obvious cause." Many cases of intracerebral hemorrhage were reviewed in which at surgery a small aneurysm or angioma seemed to be the cause of hemorrhage. These cases were discarded, and only those cases which could truly be called spontaneous were included in the series. These patients were operated on at the Neurosurgical Clinic of the Faculty of Medicine of Montpellier, France, between the years 1947 and 1959.

Diagnosis

The diagnosis of apoplexy can usually be made on the basis of the clinical picture alone. Most physicians are very familiar with the picture of stroke. However, it is often difficult to determine whether the stroke is due to hematoma, thrombosis, or embolism. All may produce the same symptoms in many cases. Thrombosis and spontaneous intracerebral hematoma are common; embolism is rare. When the diagnosis is difficult one must resort to such complementary procedures as spinal tap, cerebral arteriography, pneumoencephalography, and electroencephalography.[4]

It is important to differentiate between hematoma

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and thrombosis or embolism because their treatment is so different. Cerebral thrombosis is a medical condition often treated with anticoagulant drugs. These could aggravate intracerebral bleeding if the stroke were due to hematoma, and could contribute to the death of the patient. Conversely, craniotomy would be of little value to the patient with cerebral softening due to thrombosis. To differentiate cerebral thrombosis from spontaneous intracerebral hematoma the most direct approach is to visualize the diseased vessels by injecting a contrast medium and making a radiographic study of the cerebral arteries. However, the direct injection of contrast medium in a badly thrombosed artery may result in further trauma to an already compromised circulation and aggravate the patient's condition. This complication may be avoided by cautious use of small doses of a contrast medium of lesser concentration.

When arteriography is not feasible, pneumoencephalography may show the presence of a space-occupying lesion. This is performed by the fractional injection of air or oxygen into the ventricular system of the brain via the lumbar route. This too may present a hazard, for with increased intracranial pressure producing engagement of the hemispheres, temporal herniation may cause sudden death when the tamponade effect of the spinal fluid is diminished by lumbar spinal puncture. The danger of pneumoencephalography can be reduced by using small doses of air (5 to 15 cc.) injected very slowly. When this is not wise one may study the ventricular system by injecting air via transcranial puncture of the ventricle (ventriculography). This lessens the possibility of supratentorial pressure creating dangerous herniation of brain tissue into the tentorial opening.

Other means of differential diagnosis are spinal tap and electroencephalography. If one finds grossly bloody spinal fluid in the presence of the stroke syndrome the patient probably has a spontaneous intracerebral hematoma. However, if a hematoma occurs and the hematoma cavity does not communicate with the cerebrospinal fluid system, the fluid may be normal. Electroencephalography is of value in localizing the area of lesion, but is seldom of great value in differentiating between hematoma and thrombosis. These procedures are relatively nonaggressive, however, and when their use can be helpful they can be easily and safely performed.[5] One must, however, observe the same precautions with spinal tap as with air encephalography.

In general, arteriography contributes the most information but is the most hazardous. In the presence of hematoma arteriography is not very dangerous, but cerebral thrombosis is often aggravated by injection of the contrast medium. In this series of 80 cases, however, none of the 17 deaths recorded could be attributed to the diagnostic procedures used.

Often the clinical history is so typical and neurologic signs and symptoms so classic that none of the complementary procedures are necessary for diagnosis or localization. Such patients can be operated with burr hole exploration followed by trephine or flap operation. The advantage of the direct surgical approach lies in sparing the patient aggressive diagnostic procedures and in saving the time it takes to do them. This can be of great value in the critical case.

Operative technic

Only two of the 80 cases were treated by cannula aspiration through a small opening. It was recognized early that the solid coagulum often found in intracerebral hemorrhage could not be aspirated even with a large cannula. The remaining 78 cases were operated using a large trephine (6 cm.) or flap operation to visualize a large area of cortex. These procedures were performed under local anesthesia, which occasionally had to be supplemented with intravenous Pentothal sodium if the patient became agitated during operation. A large cranial opening provided a distinct advantage in better exposure and visualization of the hematoma cavity. The cranial opening was usually placed over the Sylvian operculum, which permitted exploration in the temporal-occipital area where most hemorrhages occur and where they are most superficial.

After opening the skull and dura mater the cortex was gently palpated for a clue as to the exact location of the hematoma. A cannula was then passed into the hematoma through a "silent" part of the cortex in either the frontal, temporal, or parietal area. Using the inserted cannula as a guide the cortex was gently divided with a Cushing retractor and the hematoma cavity exposed. Both solid and liquid elements were aspirated and any site of active bleeding cauterized or ligated with metal clips. When the cavity was clean and hemostasis secure, it was filled with normal saline and closed without drainage when possible.

In 16 cases in this series secondary operation was necessary to relieve postsurgical hemorrhage. This emphasizes the need for careful hemostasis in the hematoma cavity and in the closure.

Postoperative care

After surgery the patients received intensive medical care which included antibiotics, steroids, and supportive cardiac medication. Nearly all patients required at least one unit of blood which was administered during or immediately after surgery. Postoperative fluid requirements were met by administering between 1,500 and 3,000 cc. of fluid daily by oral and intravenous routes.

Postsurgically, all patients were kept in a state of normothermia or slight hypothermia by use of ice bags, alcohol sponge baths, or hypothermia apparatus. When patients showed evidence of inability to handle pharyngeal-tracheal secretions, tracheotomy was performed with frequent bronchial toilet.

Circulatory stasis was combated by turning these patients frequently from side to side and encouraging active movement in bed. However, these patients were seldom permitted to ambulate before 7 to 10 days in order to discourage further intracranial bleeding.

Patients were permitted and encouraged to perform many duties for themselves as soon as their capacities would allow. Walking, dressing, and self-feeding were often accomplished before dismissal from the hospital.

Observations and clinical findings

The literature reports that the usual sex ratio in this condition is males to females 2:1. In this series the incidence was found to be 37 males to 43 females, or a ratio of approximately 1:1.

The patients ranged in age from 28 to 84 years. The greatest number of cases occurred in the age bracket 50 to 59 (35 cases, or 43 per cent) with the next largest group between the ages of 60 to 84 (31 cases, or 38 per cent). There were 10 patients between the ages of 40 and 49, two between 30 and 39, and two between 20 and 29.

A systolic blood pressure greater than 150 mm. Hg was found in 64 patients (80 per cent).

Persistent coma was observed in 21 patients (26 per cent) and found to be a grave prognostic sign, for 11 of these patients died, making a mortality rate of 52 per cent.

Papilledema was a rare finding, present in 4 cases (5 per cent).

Headache was recorded as a prodromal symptom in 50 cases (63 per cent).

Bloody cerebrospinal fluid was noted in 34 cases (47 per cent).

The over-all mortality of the 80 patients operated was 17 patients, or 21 per cent of the total number. These cases were divided into those considered to be acute, subacute, and chronic, as listed in Table I, and according to age, in Table II.

TABLE I—MORTALITY BY SEVERITY OF CASES

Severity	No. cases	Mortalities
Acute	41	13 (32.4%)
Subacute	22	1 (4.5%)
Chronic	17	3 (17.0%)

TABLE II—MORTALITY BY AGE OF PATIENTS

Age	No. cases	Mortalities
20-49	41	1 (7.0%)
50-59	35	7 (22.0%)
60-85	31	9 (29.0%)

From these figures it may be seen that the greatest incidence of occurrence is between 50 and 59 years of age with less tendency to intracerebral hematoma above age 60. However, when hemorrhage does occur above age 60 mortality is greater.

When reoperation was necessary in the postoperative period, either for recurrence of intracerebral hemorrhage or for extradural hematoma, an increase in mortality was noted. Of the 16 patients requiring secondary operations 4 deaths occurred, making a mortality rate of 25 per cent associated with reoperation.

When a lesion is obviously of small size and there is little evidence of increased intracranial pressure and complementary studies do not reveal any appreciable engagement of the hemispheres a conservative course is justified. However, it is our feeling that operation should be performed for all large hematomas

Fourteen of the patients who died had deep capsular lesions. The remaining 3 patients had lesions of the central oval, but had recurrence of hemorrhage during the postoperative period leading to progressive deterioration and death.

Conclusions

From the experience gained in this series of cases it is possible to draw several conclusions.

The over-all mortality in 80 cases of spontaneous intracerebral hemorrhage, varying in all degrees of severity, was 21 per cent. This was a considerable improvement over the nonoperative mortality rate of 80 to 95 per cent. Ninety-two per cent of deaths occurred in patients over 50 years of age. When the hematoma was deep in the brain, mortality was greater than when it occurred superficially. Persistent coma was a grave prognostic sign and had a mortality rate of 52 per cent. When the patient experienced complications necessitating reoperation, mortality increased, reoperations having a 25 per cent mortality rate.

Hypertension was present in 80 per cent of cases. One must conclude that it plays an important part in the etiology of spontaneous intracerebral hemorrhage.

Very serious cases were considered as emergencies and were operated very early. Less severe cases were treated conservatively and operated when in a more stable state. As expected, mortality was higher in the more severe cases which were operated early. The acute cases were taken to surgery when symptoms and signs suggested a high intracranial pressure with persistence of coma or a general deterioration of condition. Most subacute or chronic cases in this series were operated when the lesion was considered to be limited. The criteria for limitation was a return of consciousness accompanied by some improvement in general condition. Cases were operated from 1 to 21 days after the stroke. It would seem that each case must be evaluated and operated when experience and good judgment indicate.

Arteriography is the most valuable complemen-

tary diagnostic procedure in spontaneous intracerebral hemorrhage. It can be an aggressive procedure and is not without some hazard. However, by modifying the dosage and concentration of contrast media, most dangers can be minimized. When this procedure seems necessary to diagnose or localize a hematoma, the calculated risk seems justified in view of the high mortality associated with nonoperative treatment. Frequently complementary procedures are not necessary when a satisfactory diagnosis can be made on the basis of clinical history and neurologic evidence. Thus an experienced neurosurgeon can sometimes spare the patient time-consuming diagnostic procedures which may be hazardous.

In spite of the improved statistics presented comparing surgical and nonsurgical treatment not every spontaneous intracerebral hemorrhage should be operated. When a lesion is obviously of small size and there is little evidence of increased intracranial pressure and complementary studies do not reveal any appreciable engagement of the hemispheres a conservative course is justified. However, it is our feeling that operation should be performed for all large hematomas.

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Serotonin metabolism and monamine oxidase inhibitors*

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Since the latter part of 1957, when the successful treatment of angina pectoris with iproniazid was reported by Ceserman,[1] great interest has been manifested in the group of drugs known as monamine oxidase inhibitors. This important discovery, substantiated by other investigators,[2-5] has emphasized the need to reappraise the generally accepted etiology of angina pectoris. The simple concept of coronary artery spasm was a convenient hypothesis in the past; recent developments suggest that there are more profound underlying biochemical factors involved.[5]

The most widely studied monamine oxidase inhibitor, iproniazid, lost a great deal of its popularity because of numerous side reactions. Various analogues have been developed during the past 2 years with the hope that the clinical improvement reported with iproniazid could be duplicated without producing the untoward side effects.[6-8]

In 1958, Steinberg[5] reported on the results obtained in 32 cases treated with iproniazid in which 75 per cent had good response. No serious toxic effects were observed with this drug when a total daily dosage of 150 mg. was utilized. Liver damage was not a complication in these cases even though several of the patients were treated for as long as 7 months. To study the possible effects of the drug on the poorly understood physiologic amine serotonin,[9,10] 18 patients were given iproniazid and the daily output of 5-hydroxyindoleacetic acid (5-HIAA) was studied. This latter substance is the urinary end product of serotonin metabolism and affords an indirect means of determining the blood levels of serotonin. In this initial series of cases, the patients were studied for short periods and no clear-cut pattern of statistical value was observed.

The study conducted in our laboratory and reported here has a twofold purpose. The first is to describe a simple, modified quantitative test for measuring concentrations of 5-HIAA in the urine. As a preliminary step to a study of the effects of MOA inhibitors, it was necessary that two or more standard tests for 5-hydroxyindoles be set up, utilizing the materials and equipment available in our laboratory.

*This study was supported in part by a special grant from the National Heart Institute, U. S. Public Health Service, Bethesda, Maryland.
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The method of determining 5-hydroxyindoles utilizes 1-nitroso-2-naphthol and nitrous acid as reagent reactants.

The second part of this paper concerns a study of three patients treated for extended periods with the analogue 1-benzyl-2-(5-methyl-3-isoxazolyl-carbonyl)hydrazine (Marplan) and our observation on the output of 5-HIAA. Our purpose was to determine what effects MOA inhibitors have on serotonin metabolism. In this manner, perhaps a better understanding can be obtained concerning the etiology of angina pectoris and the mechanism of action of these drugs in providing clinical improvement.

Serotonin (5-hydroxytryptamine), norepinepherine and other physiologic amines have potent vasomotor and psychomotor effects. The tissues can store the amines in an inactive form, after synthesis, to be released at a later time. They also undergo a series of oxidative changes to an inactive form which is excreted from the body. In the case of serotonin, it has been found that oxidative degradation to 5-hydroxyindoleacetic acid (5-HIAA), and its subsequent excretion in the urine, account for the removal of 80 to 100 per cent of the exogenous serotonin introduced into the human organism.[11] The urinary excretion of 5-HIAA therefore represents an indirect means of estimating the rate of serotonin metabolism or at least its catabolism.

Several methods for the assay of urinary 5-HIAA have been utilized.[12,13] These methods are specific for the 5-hydroxyindoles of which 5-HIAA constitutes the major fraction in human urine.

Tests to determine blood serotonin levels are available and it might seem that this approach to a study of serotonin metabolism would be more direct and informative. However, active serotonin in excess of physiologic levels is quickly removed from the plasma and unless large excesses of the amine are present, the rise in blood serotonin is of small magnitude. In cases of carcinoid, for example, the blood level of serotonin may show a thirtyfold increase.[14]

Methods and materials

The material 5-hydroxyindoleacetic acid was diluted with distilled water to a concentration of 100 mg. per 100 cc. The solution was distributed into vials containing 5.0 ml. each. The vials were stored at temperatures below freezing and were removed as required to make dilutions for testing. A Coleman Jr. Spectrophotometer was utilized for the colormetric determinations.

The method represents our simplified modification of the quantitative assay for 5-HIAA, utilizing the development of a purple color specific for the 5-hydroxyindoles on the addition of 1-nitroso-2-naphthol and nitrous acid.[12]

Reagents •

1-nitroso-2-naphthol (0.1 per cent in 95 per cent ethanol)

Nitrous acid (prepared fresh by adding 0.2 ml. of 2.5 per cent sodium nitrite to 5.0 ml. of 2N sulfuric acid)

Ethylene dichloride.

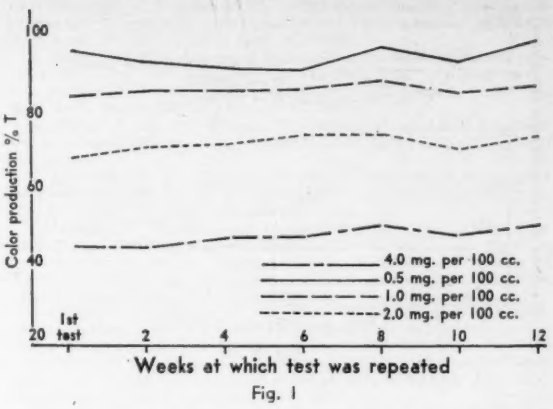


Fig. 1

Procedure •

1. Pipette into a test tube 2.0 ml. of the solution to be tested.
2. Add 1.0 ml. of 1-nitroso-2-naphthol reagent and mix.
3. Add 1.0 ml. of nitrous acid and mix.
4. Let stand at room temperature for 10 minutes.
5. Add 10.0 ml. of ethylene dichloride and shake vigorously.
6. Centrifuge at 3,000 r.p.m. for 3 minutes.
7. Remove top aqueous layer and transfer to suitable cuvettes.
8. Read in spectrophotometer at 490 millimicron wavelength.

Reproducability of test results • At approximately 2-week intervals a vial of 5-HIAA was removed from the freezer and dilutions made in distilled water to contain 4.0, 2.0, 1.0, and 0.5 mg. per 100 cc. of 5-HIAA respectively. Each dilution was subjected to the test procedure as stated. After seven such determinations covering a period of approximately 3 months, the variation in per cent transmission reading for each concentration was not found to be excessive (Fig. 1). The standard deviation of per cent transmission readings for the 4.0, 2.0, 1.0, and 0.5 mg. per 100 cc. solutions were found to be ± 2.45, ± 2.23, ± 1.95, and ± 2.08 respectively.

Using the average per cent transmission values for each concentration from this series of seven determinations, a calibration curve was constructed as a standard of comparison for future determinations. Frequent checking of standard solutions against this curve in the course of this study has shown that only rarely does the reading deviate from the average value by a figure exceeding the standard deviation. When significant deviation has occurred, it has resulted from the use of other than fresh reagents.

Effect of urinary constituents on the test results • Two sets of dilutions were made to contain 4.0, 2.0, 1.0, and 0.5 mg. per 100 cc. of 5-HIAA. Distilled water was used as the diluting medium on one set.

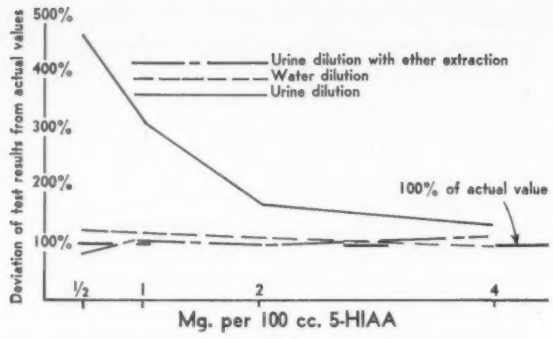


Fig. 2

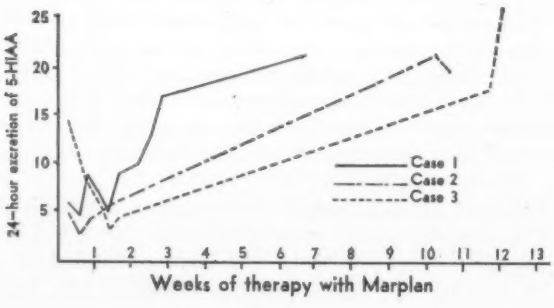
Pooled human urine was used to dilute the second set. Each set was assayed for 5-HIAA using the procedure outlined in this paper. It was found that there are substances in urine which materially interfere with the color production. By extracting the urine-diluted specimens with diethyl ether, it was found that the 5-HIAA could be separated from the interfering chromogens (Fig. 2). The results obtained from the extracted material were found to approximate closely the values obtained when water was used to make the dilutions.

The test described offers a rapid and reasonably accurate method, for clinical purposes, for the assay of urinary 5-hydroxyindoles. A portion of the specimen to be assayed must first be extracted with ether in order to remove interfering chromogens that may be present in the urine.

The reproducability of the test results is such that significant changes in the urinary excretion of 5-HIAA may be detected and measured. The relative instability of the reagents makes their freshness imperative.

5-HIAA levels following Marplan therapy • Three patients were placed on 30 mg. of Marplan daily for extended periods. During the first 2 weeks, the urinary levels of 5-HIAA were variable. This corresponds to the clinical observations that a "cumulative" period precedes the onset of pain relief. In various clinical reports, it has been noted that subjective improvement does not occur until at least 4 days after the onset of treatment, and it may be as long as 2 weeks. In this study, it was noted that after an initial "lag period" there was a threefold increase in urinary 5-HIAA after 49, 78, and 89 days respectively (Fig. 3). In the report of Steinberg,[5] one case is described where the patient received 150 mg. of iproniazid for 3 months. He was readmitted to the hospital in a state of delirium and agitation and the urinary level 5-HIAA was increased several times from the pretreatment level. The symptoms disappeared when the drug was discontinued and the level of 5-HIAA returned to the previous normal level. In the case described, the concentration of 5-HIAA was expressed in milligrams of 5-HIAA per 100 ml. of urine. In the present study, the urinary 5-HIAA is expressed as the total 24-hour output in milligrams. There is a close correlation between values in milligrams per 100 cc. and total output, as indicated in Figure 4.

Fig. 3



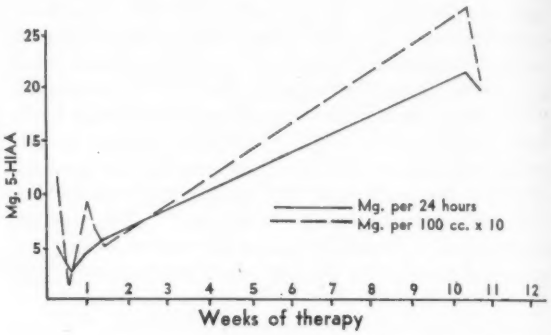


Fig. 4

Discussion

This study gives no indication as to the mechanism of the delayed increase in serotonin metabolism. There are several possible explanations which must be considered, however:

1. There may be an alternate pathway for serotonin metabolism which is independent of MAO activity.
2. MAO inhibition may result in ultimately increased synthesis so that eventually the quantitative increase at the cellular level neutralizes the effect of drug-induced MAO inhibition.
3. Selective action of MAO inhibitors may occur locally until saturation of specific tissues is effected. The elevated serotonin may then be carried to sites containing MAO which is unaffected by the level of MAO inhibitor.

This last possibility is in accord with certain clinical observations as well as certain laboratory data. It has been shown that the brain tissue has high levels of serotonin and MAO.[7] Investigations have shown that brain MAO is more sensitive to certain MAO inhibitors than is liver MAO.[8] The sensitivity of brain MAO would allow the local accumulation of serotonin (observed therapeutic effect). With further increases in the brain, this amine may then be carried to other tissues which are more resistant to the MAO inhibitor being used. These secondary sites could then oxidize the serotonin to 5-HIAA with a resultant increase in urinary excretion of this end product. Levels of MAO inhibitors sufficient to affect MAO of liver and other detoxifying tissues may prove to be the basis of the more severe toxic manifestations occasionally seen with the use of these drugs.

Summary and conclusions

A brief discussion has been presented relative to the recent discovery that monamine oxidase inhibitors have been shown to clinically improve patients with angina pectoris. The results of a study with a specific MAO inhibitor on serotonin metabolism have been presented. A simple, modified test to quantitatively determine the urinary levels of 5-HIAA as an indirect means of obtaining the blood levels of serotonin has been described. Three cases receiving long-term treatment with Marplan have been presented with the results noted on the urinary output of 5-hydroxyindoleacetic acid.

Laboratory studies with the urinary excretion of 5-HIAA indicate an initial depression of serotonin metabolism occurring 1 to 2 weeks after therapy was begun. Urinary levels of 5-HIAA at 7 to 12 weeks following therapy indicate a threefold increase in urinary 5-HIAA above normal pretreatment levels. The possibility of a breakdown of the MAO inhibitory effect after prolonged therapy has been mentioned. The relation of this breakdown to increased serotonin metabolism and delayed side effects, which are occasionally observed, deserve consideration and more extensive investigation.

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Roentgenographic changes seen in sickle-cell anemia*

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The purpose of this article is to review the current literature pertaining to roentgenographic findings in sickle-cell anemia, to describe our experience with the condition at Chicago Osteopathic Hospital and Clinics, and to present two case reports.

Sickle-cell anemia is seen predominantly in Negroes; however, cases have been reported in white individuals, apparently persons having a Mediterranean origin. It is difficult to rule in or out the possibility of Negro blood in the white patients' ancestry.

*This paper, submitted in partial fulfillment of the requirements for certification by the American Osteopathic Board of Radiology, 1959, was prepared during a residency in the Department of Radiology of the Chicago Osteopathic Hospital, Chicago, of which Ray E. Bishop, D.O., is chairman.

The sickling trait has been observed in about 7 per cent of Negroes, with sickle-cell anemia representing about 0.2 per cent, or a ratio of 40 to 1 sickling trait to sickle-cell anemia. Sickle-cell anemia is found predominantly in young Negroes and is rarely seen after age 20. The cause can vary from individual to individual, with the earlier the onset, the less favorable the prognosis.[1,2]

Laboratory and clinical diagnosis

Pathologic findings • The diagnosis is primarily established by visualizing the sickling of the erythrocytes. This may be visualized on an ordinary smear seen under the microscope, or perhaps by special studies such as incubation at 37 C for a given period.

Erythrocyte counts tend to be about 2,000,000 per cu. mm. It has been shown that variations in erythrocyte size are due to oxygen saturation producing an elongation of the cell. Exposure of the erythrocytes to air is one method of further examining the blood for a sickling configuration.

There is frequently a leukocytosis ranging from 10,000 to 30,000 leukocytes per cu. mm. There may be hyperbilirubinemia, and urobilin excretions may be markedly increased in the urine and stools. The icterus index may be elevated from 15 to 25 units. Bone marrow studies may show an increase in nucleated erythrocytes with as many as 50 to 75 per cent of these nucleated cells being normoblasts. This finding is little different from that seen in other hemolytic diseases except in the appearance of the nonnucleated erythrocytes.

The basic pathologic mechanism is that of congestion, thrombosis, necrosis, and fibrosis. The congestion is apparently due to the abnormal configuration of the erythrocytes which causes a slowing of blood flow and consequent stagnation. Once there is stagnation, thrombosis ensues; with a lack of oxygen, necrosis follows; finally there is a healing process, fibrosis. If this basic pathologic process is kept in mind the evaluation of the clinical and roentgen findings can be clearly understood.

Signs and symptoms • The clinical picture that sickle-cell anemia most frequently simulates is that of rheumatic fever. Frequent findings are fever, leukocytosis, precordial pain, bone and joint pains, and abdominal cramping. There is frequently cardiac enlargement and murmurs. There may be tachycardia with sinus arrhythmias and possibly a systolic thrill over the precordium. There may be a sudden increase in weakness and fatigability.

The patient with sickle-cell anemia tends to have a linear habitus with long legs and a short trunk. Involvement of the spine may produce a kyphosis. One patient seen at this hospital who had frequent exacerbations also suffered considerable abdominal and back pain.

If the diagnosis had not been known, other possibilities would have had to be considered, such as appendicitis, intestinal obstruction, urinary calculi, or even cholelithiasis. The pain was usually quite severe and generalized. If joint pain is severe, a confusing picture roentgenographically and clinically may be seen, suggesting osteomyelitis or other infectious processes within the joints. Chronic leg ulcerations have been noted in the older age group.

It should be noted, however, that symptoms may be few and slight and the possibility of sickle-cell anemia may first be suspected on roentgen examination. It has been said that to suspect sickle-cell anemia is to diagnose the disease. Here the radiologist can help the clinician. Neurologic findings such as asphasia, headaches, drowsiness, convulsions, stiff neck, and paresthesia of the extremities may suggest poliomyelitis; however, a routine chest examination may show a coarse trabecular pattern in the ribs and acromion process and may lead to the detection of sickle-cell anemia.

Roentgenographic findings

Chest and abdomen • The films most commonly taken of these patients are of the chest and abdomen. The radiologist must be alert for early diagnosis of the disorder. The chest roentgenogram may show a cardiac enlargement which should encourage a close look at the bony structures on the film. The shoulder girdle should be studied for a coarse trabecular pattern of the lateral aspect of the clavicle, the acromion process, and the portion of the humerus.

Pulmonary infarcts may be present; however, this finding is somewhat rare. It has frequently been seen that pneumonia may stimulate a sickle-cell anemia exacerbation. There may be cardiac enlargement with a mitral configuration or enlarged pulmonary conus.

The abdomen will usually give the most diagnostic signs; a single film may lead to a series of roentgenograms and the final diagnosis of a hidden anemia. Hepatomegalia and splenomegalia are frequently seen, especially in the young individual. Colon studies may tend to substantiate splenomegalia by showing compression or distortion of the splenic flexure. Osseous structures seen on the survey film of the abdomen may demonstrate coarse trabeculation, particularly the vertebral bodies and upper ends of the femur. Calcifications have been visualized within the spleen, and occasionally there is evidence of cholelithiasis. These are usually small concretions but may at times be associated with large gallstones; these are seen most frequently in the older age group.

Dorsal lumbar spine and pelvis • Generalized osteoporosis may be noted throughout all osseous structures. The coarse trabecular pattern seen in the survey film of the abdomen may be further investigated, and then biconcavity of the vertebral bodies with a seeming enlargement of the intervertebral disk spaces may be seen. This compression of the vertebral bodies is apparently due to a weakening of the osseous structures as the body attempts to produce more erythrocytes. As a result there is hyperplasia of the bone marrow and a decrease in calcium and normal osseous tissue.

Thrombosis has not been visualized in the vertebral bodies in our hospital. However, one finding lightly stressed in most reports and seen rather often in this hospital was unilateral or bilateral aseptic necrosis of the femoral heads. One patient with deformed vertebral bodies had evidence of severe back and hip pain from the necrotic epiphysis. The changes seen on the femoral heads can again be explained on the basis of congestion, thrombosis, necrosis, and fibrosis.

Long bones and hands • Examination of the long bones and hands should follow. Again there is the possibility of seeing an increased trabecular pattern, osteoporosis, widening of the medullary cavity, and some early thinning of the cortex with perhaps late evidence of sclerosis and periosteal reactions. These signs are a result of hyperplasia of the bone marrow.

The roentgen findings are particularly pronounced in the hands following an acute exacerbation; when roentgenograms are taken at a later date these changes may have completely disappeared. Roentgen examination done at about 2 weeks after an acute phase is most likely to pick up changes that will not be seen at the time of another exacerbation or 1 to 2 months later. It is thought now that roentgen findings within the hands and skull are not seen as frequently as was previously suspected; this has been in line with our experience. It may be partially explained by bony changes not being of a permanent nature.

Skull • The most frequent roentgen finding is widening of the diploic spaces with thinning of the tables of the skull. There occasionally may be thickening of the calvarium with evidence of radial striations extending from the inner table, giving a diffuse appearance to the outer table. These radial striations are apparently caused also by an increase in bone marrow in an effort to increase the production of erythrocytes.

Differential considerations • Of course, the diagnosis of this condition ultimately lies with the pathologist's identification of the sickled erythrocytes. Most of the roentgen findings seen in sickle-cell anemia can be demonstrated in other blood dyscrasias, such as Cooley's anemia or the leukemias. These again would be differentiated by their particular blood pictures.

Apparently less than half of anemia patients have actual bone changes, and in only a few of these is there striking evidence as is demonstrated in this

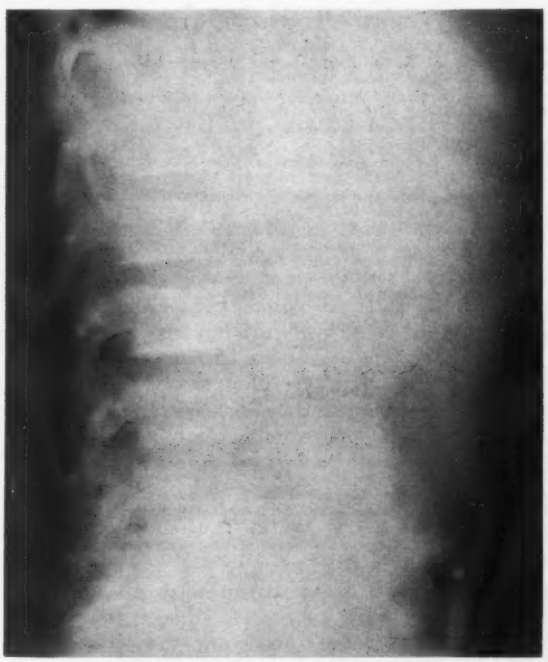

Fig. 1. Faintly visualized biconcavity of the vertebral bodies, with preservation of intervertebral disk spaces, seen in Case 1.

Fig. 2. Biconcavity of the vertebral bodies, increased trabeculation, areas of body infarction, and bilateral aseptic necrosis of the femoral heads, seen in Case 1.

condition. If isolated areas show roentgen findings there may be confusion with caisson disease which would produce multiple bone infarcts, although here one should be able to differentiate by an adequate history. Hemangiomas of the vertebral body may simulate the coarse trabecular patterns seen in the anemias; however, hemangiomas are usually singular and involve just one vertebral body. The flattening of the femoral heads with the aseptic necrosis seen in sickle-cell anemia could possibly be confused with tuberculosis or osteomyelitis; however, there should be involvement of the interarticular spaces and acetabulum in these diseases. There should be preservation of the interarticular space in aseptic necrosis, at least early.

The dactylitis produced by syphilis could cause a confusing picture; however, this is usually limited to one or two segments, whereas the anemias cause a more generalized involvement.

The roentgen findings in sickle-cell anemia are most valuable in causing a suspicion of this blood dyscrasia rather than an actual diagnosis. Hematologic studies certainly must be carried out.

Illustrative cases

Case 1 • A 12-year-old Negro boy first came to this clinic on January 15, 1956, with a chief complaint of a generalized muscle and joint pain. He was hos-

pitalized and a diagnostic work-up was completed. It was felt that there was a possibility of rheumatic fever and/or meningitis, but laboratory tests failed to show this. He was discharged from the hospital with a final diagnosis of viral pneumonia with the possibility of rheumatic fever. The patient returned to the clinic on June 19, 1956, with an acute exacerbation of the original complaint, and was again hospitalized. At this time there was considerable low-back pain, and roentgenograms of the lumbar spine and pelvis were ordered. They showed severe biconcavity of the lumbar vertebral bodies and a coarse trabecular pattern throughout most of these osseous structures (Figs. 1 and 2). There was also a bilateral aseptic avascular necrosis of the femoral heads. Sickle-cell anemia studies had previously been done and showed a definite sickle-cell trait. The erythrocyte count remained low, at 3,300,000 per cu. mm. Some other important laboratory findings were noted, such as an increase in leukocytes to 15,200 per cu. mm. Hemoglobin was 9 grams. Sickle-cell studies were repeated and again were positive. Bone marrow studies were inconclusive. An electrocardiogram showed evidence of a first degree A-V block.

In this case typical roentgen findings stimulated repeated tests for sickling of the erythrocytes, which was finally demonstrated by laboratory procedures.

Case 2 • A 9-year-old Negro boy had had a painful hip for several weeks; apparently the pain was located in the region of the inguinal ligament halfway betwen the pubes and the anterior-superior spine. The pain was sharp and occurred suddenly. The onset was late afternoon and evening, after activity, and was relieved by lying supine. Physical examination showed a hypersthenic child with evidence of a plus 1 icterus of the sclera and evidence of grade 2 systolic murmur. There was a slight fever; leukocyte count was elevated to 12,900 per cu. mm. There were 2,510,000 erythrocytes per cu. mm. Roentgenograms showed a bilateral aseptic necrosis of the femoral heads with sclerotic areas along the shaft of the femur. Chest x-rays showed evidence of cardiac enlargement with some prominence of pulmonary conus (Fig. 3). Films of the skull showed thinning of the tables with some increased prominence of the diploë. Sickle-cell studies were positive.

Fig. 3. Cardiac enlargement with some prominence of the pulmonary conus, seen in Case 2.

Summary

Sickle-cell anemia is a familial disease seen primarily in Negroes. The basic pathologic physiology is that of congestion, thrombosis, necrosis, and fibrosis, with an attempt of the body to produce more erythrocytes. The sclerotic changes seen in bone are primarily due to thrombosis or infarcts with sclerosis. The remaining roentgen findings are accounted for by an attempt of the bone marrow to increase its production by hyperplasia, causing a coarse trabecular pattern, osteoporosis, thinning of the cortex, and radial striations. The symptoms are similar to those for rheumatic fever, with multiple joint pains and occasionally severe abdominal and back pains. Roentgen findings are frequently suggestive but rarely diagnostic of sickle-cell anemia. I feel that in these cases the radiologist can be most helpful by thoroughly evaluating the survey films of the chest and abdomen. These are the most frequent examinations carried out on these patients, and careful study of the osseous structures on these films can lead to a diagnosis of the underlying blood dyscrasia.

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EDITORIALS

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Medical writing and editing

Rudolf Virchow is reported to have said of his famed *Archiv*, "In my journal, anyone can make a fool of himself."[1] However, it is safe to assume that he was referring to unconventional scientific viewpoints, not faulty writing. Most modern journal editors labor long and hard to groom their publications so that their authors do *not* unwittingly make fools of themselves. They insist on proper scientific backing for untried therapeutic methods, an acceptable scholarly writing style, and evidence that the author is familiar with current writings on his subject but has not leaned upon them too heavily. The total desirable effect is a publication which will serve as a trustworthy occasional mentor.

Much is said about the poor quality of medical writing these days, and blame is thrown on almost everything: the doctor's home, grammar school, high school, college, and medical school. Many articles say that it would be nice if he were a better writer, and that perhaps he should bend some effort toward gaining the skills he somehow missed. No one says exactly how this can be accomplished, partly because there is no exact formula. Most books on medical writing are actually style manuals designed to convey a preference on certain matters of usage rather than to give basic help to the doctor who finds the whole field distressingly alien. A new book, *The Preparation of Medical Literature*, by Louise Montgomery Cross, offers real assistance. It was reviewed in the June JOURNAL, page 867. If the doctor knows a subject from a predicate and a reasonable amount about dangling modifiers, and feels that he has something to say to his colleagues, he will find in this new book considerable guidance for getting his articles into print.

The review makes brief mention of the emotion-charged atmosphere which often exists between author and editor, and some development of that theme is in order here.

Why do editors edit as they do?

The most obvious answer to this question is "style." In order to maintain consistency throughout a journal, the editor makes minor changes in all papers so that spelling, use of numbers, and punctuation are uniform. Writers for THE JOURNAL may have noticed these changes, some of which are arbitrarily chosen from a wide field of divergent (all equally correct) usages: Compound words are set solid, except when there is a double letter at the normal break (e.g., postoperative, but post-traumatic; intrathoracic, but intra-abdominal). The use of numbers depends on the noun modified rather than on the number's occurrence in the cardinal scale (e.g., 3 years, but three patients). Series are broken by commas in the older, classic style because of the lessened possibility for misinterpretation of important scientific facts. Certain words are spelled in a particular way: "technic" instead of "technique" is one example. These changes rarely cause difficulty, but the author should know that they are a matter of consistent style and not merely the editor's personal preference.

Another thing the editor does is to add subheads and sideheads. This is partly for the sake of appearance, but more as a service to the busy reader who needs to be guided quickly to matters of interest. Ideally, these subheads and sideheads should represent an outline of the paper; in fact, the author can test the organization of his paper by attempting to apply his own subheads. It is actually much better procedure for him to start with the subheads and sideheads (outline) and fill in the copy according to well-thought-through classifications.

There is occasion for misunderstanding in this general area. It sometimes happens that a paper

contains material that is important for publication, but is in one of various states of disorganization. Because the editor realizes that the reader will never take the trouble to "wade through" the ambiguities and repetitions to find the real point, he takes scissors and glue and does what the author should have done in the first place: collecting like with like, formulating a logical arrangement, and sometimes rewriting transitional sentences to give the whole better cohesion. The "patchwork quilt" result is certainly less than ideal; the author could do far better by taking down his research notes and doing all but the final writing on cards, which can be easily shuffled and rearranged as the paper develops.

Another kind of rewriting concerns papers originally prepared for reading before society meetings. The informal style which "speaks well" is obviously not suitable for the more formal style of a journal. Often it is necessary to delete long introductory remarks that, in the original reading, served well to capture the attention of the audience and set a mood. These prefatory remarks frequently include personal references and anecdotes which have only oblique bearing on the subject at hand. In general, these papers also must be "boiled down"; it is a good principle of teaching to repeat important points for emphasis, but in the written form this becomes merely repetitiousness. Some authors find it convenient to prepare a paper in a formal manner and then speak extemporaneously from it, submitting the formal draft for publication; others prepare two scripts, one formal and the other informal for reading at the meeting. In a few instances, the editor will take the two scripts and form one paper for publication.

All this may imply that the medical editor works to produce dull factual prose, from which any trace of the author's individuality is completely erased. Indeed, this does happen to some degree when an overzealous editor attacks a paper with a bias in favor of a particular stereotype. However, this is not good editing. On the other side of the coin, good writing should convey the author's personality in a learned and subtle enough manner that the point he is making will not be obscured by the cleverness—or even the brilliance—of his manner of dissertation. Discipline enters the field as much in resisting the temptation to overwrite as to underwrite. Samuel Johnson quoted a college tutor as saying to a pupil, "Read over your composition, and wherever you meet with a passage which you think is particularly fine, strike it out."[2] And we would add, "Or at least make your judgment in the cold light of a different day."

Other suggestions could be made in greater detail, but because of space limitations they will simply be mentioned here. The style of references is standardized in THE JOURNAL, as in other publications; any author can ascertain the form from a reference list in a previously published article. The reference material should always be accurate and complete. It is not considered ethical for unread references to be included as background for a particular paper; at the other extreme, it is certainly not ethical for the references to form the sole basis for the paper. Two parts of Hewitt's[3] decalogue for the medical expositor give good advice:

> Thou shalt not fail to place within quotation marks the words of another, nor shalt thou fail to verify the accuracy of thy quotations.
>
> Thou shalt not consider that to alter the words of another frees thee from the obligation to credit that other with an idea that thou has borrowed from him.

Finally, there is the matter of correcting specious thinking, especially as it relates to research results. Poorly controlled studies, errors in arithmetic, ignorance of statistical methods, incomplete descriptions, and biased reporting are unfortunate marks of too many less skilled writers. These things often make the difference between routine editing, extensive revision, or even rejection.[4,5]

Some trenchant remarks by the late Alan Gregg[6] give caustic encouragement to the beginning medical writer:

> Don't make the neurotic assumption that since you can't write easily and well, other people must just have a knack. Nor divorce Sweat to marry Envy. Professional writers find writing hard too, but they have no airy excuses such as "After all I'm not a writer—I'm a research man." I would suppose the erasers of their pencils nearly always wear out long before the leads. Indeed, most success in writing a clear, truthful, and concise account of anything depends more on your ability to rewrite, condense, and tenaciously edit your own stuff—from the first through the fourth draft—than on what appears in the first writing. A first draft that takes an hour to write may well take 4 to 12 hours of revision—preferably at well-spaced intervals.

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3. Hewitt, R. M.: Physician-writer's book: tricks of the trade of medical writing. W. B. Saunders Co., Philadelphia, 1957, p. 315.
4. Editorial: Selection of manuscripts for publication. J. Am. Osteop. A. 57:276-277, Dec. 1957.
5. Jordan, E. P., and Shepard, W. C.: Rx for medical writing. W. B. Saunders Co., Philadelphia, 1952.
6. Gregg, A.: Brevity. Am. J. Psychiat. 109:936-937, June 1953.

Cumulative Index and Union List

A practical and long-needed aid to osteopathic scholarship is just off the press. This new publication includes a Cumulative Index of the first fifty-five volumes of THE JOURNAL, and a Union List of osteopathic books contained in the A.O.A. and osteopathic college libraries.

The new volume will be of inestimable value to students, historians, and research workers. The Index covers original articles, editorials, and organizational information published in THE JOURNAL from September 1901 through August 1955. The Union List is a compilation of titles and authors of osteopathic library books concerned with osteopathy and books written by members of the osteopathic profession.

Publication of the Index and Union List represents co-operative effort. The project was sponsored by the A.O.A. Committee on Clinical Study, was

financed by the A.O.A. and the Foundation for Research of the New York Academy of Osteopathy, and was produced by the A.O.A. Editorial Department. According to Committee plan, supplements will be published at 5-year intervals.

There is no question of the importance of this project. It will prove a boon in that it provides a key to the body of osteopathic writings. The Committee on Clinical Study is to be congratulated upon the completion of the first step in a monumental task.

A positive approach

The U. S. Public Health Service in this year's report stresses a shift in its focus of attention which comes home to every osteopathic physician. It is a real homecoming, because the basic idea has lived in osteopathic medicine ever since Dr. Still established the foundations.

P.H.S. emphasizes heavily that its work more and more is being directed towards the interpretation of health in positive terms. It cites the World Health organization definition:

"Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."

In the past P.H.S. has aimed at the alleviation of the major diseases, reducing the burden of pathologic scourges which recorded such staggering statistics when a year was totalled. Disease is still very much in P.H.S. planning, but now the implicit suggestion to all individuals and organizations concerned with health care is to become an army campaigning on the offensive, not merely erecting Maginot Lines and digging trenches.

Environmental sanitation, hospital construction, laboratory research, and the facilitation and encouragement of medical education have always been in the P.H.S. picture. Now they are moving to the foreground. Most dramatic, perhaps because it expresses itself in dollars, is the shift revealed by the budget for the National Institute of Neurological Diseases and Blindness. In 1954 it was $4½ million, in 1959 $29 million, and in 1960 $41 million.

The P.H.S. shift of approach has not been an arbitrary decision resolved by a board or committee. It has evolved from the necessities of the changing times. Over the past few decades public health programs have been responsible for a substantial saving of life, particularly younger life, and, inevitably, an older population having more chronic diseases of all types.

A rapidly growing population, growing not only by the survival process of both old and young, but also because of a continued high birth rate, has brought with it crowding and its attendant problems. So P.H.S. urges thinking in terms of well-being as well as in terms of morbidity, and the establishment of community services that will preserve the wholesome family living in time of stress.

This accords with osteopathic philosophy as it has moved along with the years since Dr. Still added to the ordinary practice of medicine of his day the concept of the body's capacity for being well and staying well. This should be every physician's total concern, rather than just getting a patient over an illness.

LETTERS

▶ SIR: The article by Hershman and Matthews, "Idiopathic Thrombocytopenic Purpura in Pregnancy," published in the December 1959 issue of THE JOURNAL, contained too many erroneous statements to pass without corrective comment.

To begin with, the introductory statement indicates splenomegaly to be usually present in idiopathic thrombocytopenic purpura. This is not consistent with the experience of most hematologists. Wintrobe[1] reports the spleen to be palpable in approximately one-fifth of cases. Monto, Rebuck, and Brush[2] reported palpable enlargement of the spleen to be virtually always absent.

The statement that bone marrow is either "depressed or more often is found to be normal" is also erroneous. My experience is consistent with that generally described in the listed articles.[1-3] I have often demonstrated atypical megakaryocytes as well as increased numbers of megakaryocytes. Varying degrees of granulocytic or erythroid hyperplasia are also demonstrated, depending upon the severity of the initial bleeding circumstance.

The reference to coagulation studies is also in error, in part. The clotting time is generally normal; the bleeding time is frequently prolonged. The authors would indicate that the clotting time may be normal to slightly prolonged, and the bleeding time markedly prolonged. I agree that there is generally increased capillary fragility. Bleeding time is classically described as being prolonged, although not infrequently it will have reverted to normal even though thrombocytopenia of a moderate degree persists. This may be a reflection of the initial capillary fragility.

The next few paragraphs enter into a rather jumbled review of primary and secondary thrombocytopenia and a rather obscure discussion of complement-

fixation reactions. The impression gained from these statements, however, is that there is always antigen-antibody or complement-fixation reaction in thrombocytopenia. This is not the opinion of most hematologists. I refer the reader to "Panels on Therapy," published in *Blood* for April 1956.[4] The conclusion reached by Hershman and Matthews that the saline dissolution effect explains the rarity of thrombocytopenic purpura is to be challenged. Secondary thrombocytopenia can be due to antigen-antibody reaction, but it may also be a reflection of marrow replacement such as occurs in acute leukemia, carcinomatosis, or myelofibrosis. Further, thrombocytopenic purpura is not rare. If one were to include the idiopathic and secondary forms, thrombocytopenic purpura might then constitute the most frequently encountered bleeding disorder in the general hospital.

The paper is apparently a report of primary thrombocytopenia and yet the authors see fit only to produce an irregular, haphazard listing of the etiologic factors of secondary thrombocytopenia. Hypergammaglobulinemia is indicated as the probable cause of thrombocytopenia in leukemia and lupus erythematosus. This is not always true. We are presently engaged in a study of electrophoresis of marrow and serum proteins in association with changes occurring in the marrow cellular elements. Our studies are not complete, but to date it would seem that significant hypergammaglobulinemia has not been demonstrated in our cases of thrombocytopenia. It is readily shown, however, that the diffuse replacement of the marrow in acute leukemia by the proliferating leukemic cell produces myelophthesic thrombocytopenia (a secondary form). This cause of secondary thrombocytopenia is not listed, however.

One questions the short paragraph concerning capillary defects in thrombocytopenia. I quote: "A capillary defect is also noted in thrombocytopenic purpura. This, too, is unexplained, but the mechanism is one of thrombosis and hemorrhage." I am admittedly unable to follow this reasoning. Further, reference for this statement is not given. The section dealing with the disease in obstetric practice quotes statistics relative to the incidence of thrombocytopenia in infants born to splenectomized or nonsplenectomized mothers. References are not given for these percentages. This should have been done so that further information might be obtained as to whether these cases are idiopathic or secondary thrombocytopenia. The authors have neglected to indicate the etiology of the thrombocytopenia for which the mothers underwent splenectomy.

The statement, "pregnancy aggravates thrombocytopenia" appears in the summary. I would appreciate a reference for this statement, or a review of the personal experience of the authors in this connection.

This letter is written with a specific purpose in mind. The publishing of articles must not be an end unto itself. Unless the article has been carefully edited, gross misstatements can occur and are quite misleading to the readers who assume the published work to be correct. I would urge the formation of an Editorial Board for THE JOURNAL, composed of individuals willing and qualified to edit those articles relating to their specialty practice and experience. Misinformation may be a greater detriment than no information.

SIDNEY J. KATZ, D.O.
Huntington Woods, Mich.

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3. Dameshek, W., and Miller, E. B.: Megakaryocytes in idiopathic thrombocytopenic purpura, form of hypersplenism. Blood 1:27-51, Jan. 1946.
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SPECIAL ARTICLE

The D.O. in disaster medicine

OTHA W. LINTON, A.O.A. Press Representative

Suppose you knew that a nuclear bomb might hit near your community. Suppose you knew that a flood or an earthquake or a tornado was likely to strike, causing death, and injury and destruction.

As a doctor, you know your skills and services would be needed, whether the disaster was caused by man or by nature. How would you give these services? Where? To whom? What could you do if the power failed, the water supply were contaminated, and the waste disposal systems broke down? What if the hospital itself were destroyed? What if only a few could be saved from many who were hurt?

If such an emergency came to your town, it would be too late to plan. Everyone, doctors included, would have to make do, improvise, and get along as best they could. There might be a lot of wasted effort, unnecessary sickness and injury, and perhaps even riots because there would be no provisions to carry on government, to maintain order, to restore services, or to give you as a physician the help and tools you need to do your tasks.

With these things in mind, the federal government and concerned citizens have moved to organize for every aspect of emergency and disaster planning. Through the federal Office of Civil and Defense Mobilization a national plan for civil defense and defense mobilization has been prepared. A vital part of that plan is its provisions for health care, for adjusting to the loss of people and facilities, and for coping with the health problems of survivors.

The federal government can only spell out such a program. To give it meaning, the OCDM and the U.S. Department of Health, Education, and Welfare must rely upon the voluntary participation of those normally concerned with the nation's health care.

Along with other professional groups and health agencies, the American Osteopathic Association was represented at a series of three courses on health services aspects of health mobilization in the spring of 1960. They were conducted jointly by the U.S. Public Health Service's Division of Health Mobilization and the OCDM at Brooklyn, New York, Battle Creek, Michigan, and Alameda, California.

"The purpose of the courses," according to Dr. Carruth J. Wagner of Washington, D.C., "was to bring the most up-to-date disaster information and training to a nucleus of professional personnel concerned with medical and health needs of the civilian population in an emergency." Dr. Wagner is chief of the Division, established in 1959 to carry out health responsibilities involved with civil defense planning.

Among the subjects covered in the busy 5-day curriculum were medical self-aid; medical care by allied medical personnel; emergency hospital layout; radiologic, biologic, and chemical warfare; preventive medicine; epidemiology in disaster; disaster sanitation; community health services planning; and basic instruction technics.

Lecturers included staff members of the Public Health Service, armed forces medical officers, faculty members of the OCDM staff college, and specialists in health planning. Dr. W. Fulton Abercrombie of Washington, PHS education specialist, was course coordinator.

Besides D.O.'s, students at the courses included M.D.'s, dentists, pharmacists, veterinarians, nurses, sanitary engineers, health educators, local civil defense directors, and government agency staff personnel.

The courses were intended to provide the students with information, materials, and enthusiasm to carry out similar courses at state and local levels and within their professional organizations. Most of the course content was based on the premise that areas coming under attack or suffering natural disaster must expect a disruption of communications and transportation which would require them to exist for days or weeks on their own resources.

Thus, it was stressed, each state, each community, and each hospital needs disaster plans for the alternatives of full utilization of all facilities, use of some or damaged facilities, or for the possible evacuation

Statement for American Osteopathic Association regarding utilization of osteopathic physicians postattack

The Public Health Service, operating under the policy direction of the Office of Civil and Defense Mobilization and its national plan, has major responsibility in the federal government for civil defense health and civilian health mobilization programs. The Public Health Service recognizes that there will be a tremendous postattack disparity between health manpower needs and resources. The extent to which the nation can recover after an attack will depend upon the most complete utilization of all health personnel in the relief of suffering, the preservation of life, and the protection of the health of the public.

With this in mind, the National Health Plan for Civil and Defense Mobilization (Annex 18) defines not only health services and occupations, but also the responsibilities of those professional groups who perform these services in a civil defense emergency.

In relationship to the profession of osteopathy, the National Health Plan makes the following points:

1. The definition of health manpower specifically includes doctors of medicine and osteopathy, dentists, sanitary engineers, and registered nurses.

2. The American Osteopathic Association is named as one of the professional organizations which "have a responsibility to advise OCDM and DHEW in organization and planning, training, education, research, and other functions pertinent to each association. The respective associations are encouraged to establish committees for this task."

3. The National Health Plan places upon every doctor of medicine and of osteopathy the responsibility of active participation in civil defense and defense mobilization planning and training in his community.

4. Since state and local health departments have the primary and statutory health roles at their respective levels, exercise of this participation can most effectively be carried out within the local communities. Plans for personnel utilization must be developed at the local level. These plans will differ from area to area, dependent upon relative needs, availability, and peacetime practices and relationships existing among health professional personnel.

In accord with the National Health Plan, the Public Health Service, acting within the framework of DHEW's civil and defense mobilization role, welcomes the counsel and advice of the American Osteopathic Association, and the active participation of all its members.

of the entire surviving population from a disaster area.

At Hiroshima, it was pointed out, thousands were killed and many thousands injured by a nuclear bomb now considered puny. But other thousands survived, and even more might have if the city had been prepared for the possibility of such devastation and if surrounding communities had been able to care for evacuees. Even so, those who lived through the blast and heat of the explosion did their best to care for the injured and restore the city without much planning. Few American cities have much more civil planning than Hiroshima did.

Except for the dread hazard of radiation, the survivors of a nuclear blast have much the same problem which faced Texas City, Texas, when an ammunition ship blew up in its harbor. They face something of the same chaos found after an earthquake in Chile, Morocco, or even Yellowstone Park. The isolation of a stricken area, disruption of its government and community services, and the evacuation of many people to temporary shelter create sizable public health problems in addition to the immediate task of caring for the injured. The known existence of chemical and biologic warfare agents which may be used to poison food and water adds to the responsibility of health planners.

Reflecting awareness of over-all civil defense and disaster problems, the Congress in 1950 passed Public Law 920, the so-called federal civil defense act which delegated civil defense responsibilities to the states. However, a lack of progress by state organizations led to enactment of legislation (P.L.85-606) giving the federal government a more direct share in the creation of local emergency plans.

In 1958, the national civil defense plan was prepared. Among its forty-two annexes, number 18 is the national health plan, number 23 is the radiologic defense plan, number 24 is the biologic and chemical warfare defense plan, and number 32 is the water conservation plan. All are immediately concerned with health planning, not simply by physicians, but by all health workers. The plan and any of its annexes are available from OCDM.

As the principal federal health agency, the PHS was asked by OCDM to assume responsibility for health planning. To coordinate its efforts, the Division of Health Mobilization was created in the PHS Bureau of State Services.

Within the structure of OCDM, two advisory groups have been created. The Health Resources Advisory Committee is made up of representatives of nongovernmental health organizations. The Interagency Health Advisory Board represents the several government agencies having health functions.

In addition to federal legislation on civil defense, many states have passed laws defining their responsibility and creating structures to implement it. In substance, these laws and the federal statutes provide that in declared national or local civil defense emergency, local civil defense organizations will take over government functions with such authority as may be needed to implement emergency plans. Physicians and other health workers will be obligated to participate as directed by local directors of health planning. Private property and supplies may be requisitioned by civil defense authorities.

"A local civil defense director and his deputies will have the authority to do anything needed to meet the emergency," explained Dr. James M. Ridgeway of Battle Creek, dean of the OCDM staff college.

Some statements from the National Health Plan may point up the extent of current mobilization:

Health services means medical and dental care in all of their specialties and adjunct therapeutic fields, and the planning, provision, and operation of first aid and emergency medical care stations, hospitals, and clinics; preventive health services, including detection, identification and control of communicable diseases, their vectors and other public health hazards; inspection and control of purity of food, drugs and biologicals; food and milk sanitation; public water supplies; sewage and other waste disposal; registration and disposal of the dead; prevention and alleviation of water pollution; vital statistics services; preventive and curative care related to human exposure to radiological, chemical, and biological warfare agents; and rehabilitation and related services for disabled survivors.

Listed as health manpower within the terms of the plan are "physicians (including osteopaths), dentists, sanitary engineers and registered nurses" plus veterinarians, medical laboratory technicians, x-ray technologists, occupational and physical therapists, optometrists, podiatrists, pharmacists, medical and psychiatric social workers, clinical psychologists, hospital dietitians, and ambulance drivers, among others.

Realizing that as many as a third of the physicians and other health workers could be casualties, the plan points out that procedures normally performed only by doctors may have to be accomplished by others. Dentists and veterinarians might give anesthesia or supervise sanitation programs. Nurses might do casualty screening. Technicians might assist with surgery or supervise wards. First aid, bandaging, splinting, and treatment for shock, resuscitation, and relief of pain could be done by all groups of workers.

The civil defense acts provide that during a declared state of emergency, normal geographic and other licensure restrictions will be without effect. Persons attempting medical procedures under the direction of civil defense authorities will not be held liable under malpractice laws for the failure of their efforts.

The American Osteopathic Association, along with the American Medical Association, American Dental Association, American Hospital Association, American Nurses Association, American Pharmaceutical Association, and other national organizations, is charged with the responsibility of training its mem-

Fig. 1. Osteopathic representatives attending the course on Health Services Aspects of Health Mobilization at Battle Creek, Michigan, May 8-13. First row: Drs. Robert J. Kromer, Sandusky, Ohio; Floyd E. Smith, Flint, Michigan; John W. Campbell, Davenport, Iowa; William Kuchera, Albert Lea, Minnesota; Richard W. Adams, Chesaning, Michigan. Second row: Otha Linton, Chicago; Drs. Walter Parsons, Orlando, Florida; G. Stevens McDaniel, East Greenwich, Rhode Island; Arthur H. Witthohn, Grand Rapids, Michigan; Ronald Woods, Des Moines, Iowa; W. Fulton Abercrombie, Washington, D.C., course director.

Fig. 2. Medical aspects of chemical warfare was the topic of Dr. Carroll P. Hungate of Kansas City, Missouri, who lectured to the health mobilization courses. Dr. Hungate is a consultant to the Public Health Service and is chairman of the American Medical Association Committee on Disaster Medical Care.

bers to meet civil defense and disaster responsibilities. Physicians are expected to help other groups to upgrade their skills for emergency use.

In some communities, dentists have been given the opportunity to observe surgery and assist in hospital emergency rooms. Without such training, most dentists would hesitate to treat anything below the collar button, a dental spokesman pointed out.

To accomplish the support phase of national emergency preparation, the federal government has taken an inventory and has urged local inventories of all health material, equipment, and facilities. Facilities counted are to include medical and osteopathic hospitals, nursing homes, health centers, clinics, laboratories, water and sewage treatment plants, and drug manufacturing plants.

Through early 1960, the government had stockpiled more than $210 million of health supplies and equipment. This includes 20 million liters of intravenous solution, 4 million pounds of enteral feeding equipment, 3 million units of blood collecting equipment, 1.2 million units of PVP, 300,000 units of serum albumin, more than a million units of lyophilized plasma, and 1,900 civil defense emergency hospital units, complete with equipment and supplies for 48 hours of operation.

Because of anticipated isolation of many communities after an attack or other disaster, civil defense authorities stressed the need for community stockpiling and awareness of available supplies.

To aid in readiness preparation and in training, OCDM and the Public Health Service are conducting study programs to create a national blood program, a national epidemiologic service, a national laboratory network, a standardized administrative manual for civil defense emergency hospitals, a standardized emergency treatment manual, and simple tests for exposure to radiation injury or chemical or biologic warfare agents.

Though health agencies must plan for their own particular function, their planning must be fitted into county or city over-all civil defense organization and disaster plan. As explained by Dr. George Moore of Charlottesville, Virginia, chief of health mobilization for the PHS's region three:

> The county chief of the health, medical and special weapons defense service is responsible for coordinating health, medical and special weapons defense activities within the county. These activities will be furnished by the county directly or by its municipalities. He serves as staff advisor to the county mobile support unit chief. The service chief commands all service personnel and issues all directives and orders. The chief of the service directs activities within the service and with the other services. He directs the utilization of personnel and equipment in all branches of medical care and allied sciences; that is, physicians, osteopaths, dentists, nurses, veterinarians, pharmacists, science teachers, first aiders and others.

In one exercise, students at the health mobilization courses were asked to undertake the health planning for the evacuation of a designated target center and the reception of its inhabitants in surrounding counties. The group was divided into small teams which were to serve as county health departments, professional societies, and a state health department.

The object lesson was quickly learned. When the teams assembled they discovered that the health department could not function without knowing what it could expect from the professional societies. The societies were not aware of what was needed or of how much they could rely upon civil defense organization to handle the logistics. The teams designated for the target city could not decide whether to evacuate all medical facilities and medical personnel or to keep some and send out others. In turn, teams representing the surrounding counties could not determine how many refugees and how many casualties they might need to provide for. The team acting as state health department quickly became ensnarled in confusion and red tape. It possessed, or thought it did, certain emergency supplies, including civil defense emergency hospitals and first aid stations, and had available some trained persons. But what authority it had to dispose and assign and how it was to determine conditions in the affected areas constituted an appropriately baffling problem.

It is to the credit of the participating teams that each one was able to evolve a plan to undertake its part of the health responsibility and even to integrate these plans with those of other teams. However, as all would admit, their solutions were based upon a considerable number of optimistic presumptions. In a local situation, planning would take longer than a day. But it could be based on known facts about community personnel, supplies, facilities, and geography. Everyone agreed that such preparation is

better made in advance than in crisis, real or imaginary.

The vital function of hospital planning was stressed at least once by almost every speaker. In any disaster ranging from a nuclear attack to a major traffic accident, the nearest available hospital becomes the focus for lifesaving efforts. Only in hospitals can the skills and supplies be brought together to provide any amount of mass casualty care.

The degree to which a hospital can adapt from routine operation to emergency conditions depends upon its advance emergency planning and the ability of its staff to convert to rapid action.

In the event of an atomic explosion, hospitals around the explosion area might expect to receive enormous numbers of casualties. Some of these would be obviously beyond medical help. Others might be contaminated radiologically as well as injured. Still others would need less help to restore them to usefulness. Perhaps persons with no injuries might attempt to get into the hospital.

It might be, on the other hand, that a hospital would receive advance warning of imminent attack and have the possibility of evacuation to a safer location. In either case, the immediate problem of sorting patients, of rapid diagnosis of what must be done, of what is hopeless to attempt, and of what can wait must be handled quickly and expertly. A surgeon might be confronted with the alternative between saving one life by complex chest surgery requiring hours or saving several others by closing wounds and performing amputations in the same amount of time.

Decisions for evacuation or shelter must be made locally just as might be done for a tornado or hurricane. Doctors, nurses, and other health workers must work as directed under civil defense conditions. But unless hospital personnel has a plan for evacuation and has accomplished it, a civil defense director's decision to do so could create only chaos.

As a session of the courses, students were shown the setting up and operation of a 200-bed civil defense emergency hospital, complete with simulated casualties.

The civil defense emergency hospital is a self-contained service unit developed from military field hospitals. Some 1,500 have been placed around the United States in strategic locations for possible use. Others, like the ones used in health mobilization courses, are available for training exercises. The hospital is contained in 351 boxes containing some 290 items ranging from swabs to a power generator and weighing 24,000 pounds. The unit's nine functioning sections are complete with sufficient equipment and supplies to function for 48 hours with a full load of casualties.

In the course exercise at Battle Creek, a team from the Battle Creek Veterans Administration Hospital, primarily a psychiatric hospital, was used to perform the demonstration. Except for the hospital administrator, members of the 69-person team had only a single briefing. In keeping with simulated disaster conditions, many of the hospital people, the 5 physicians, 10 nurses, and 38 medical aids were assigned tasks requiring more than their normal skills.

Within an hour from the time the hospital crews pulled a nail from the first crate, every section, including surgery and x-ray, reported ready to receive patients.

The patients in this instance were simulated by members of the Battle Creek Junior Red Cross who had been excused from school for acting chores and realistically decorated for their roles with moulage wounds and bleeding. Again, within an hour of the

Fig. 3. Central supply section can begin preparing surgical packs within minutes after opening of first crate.

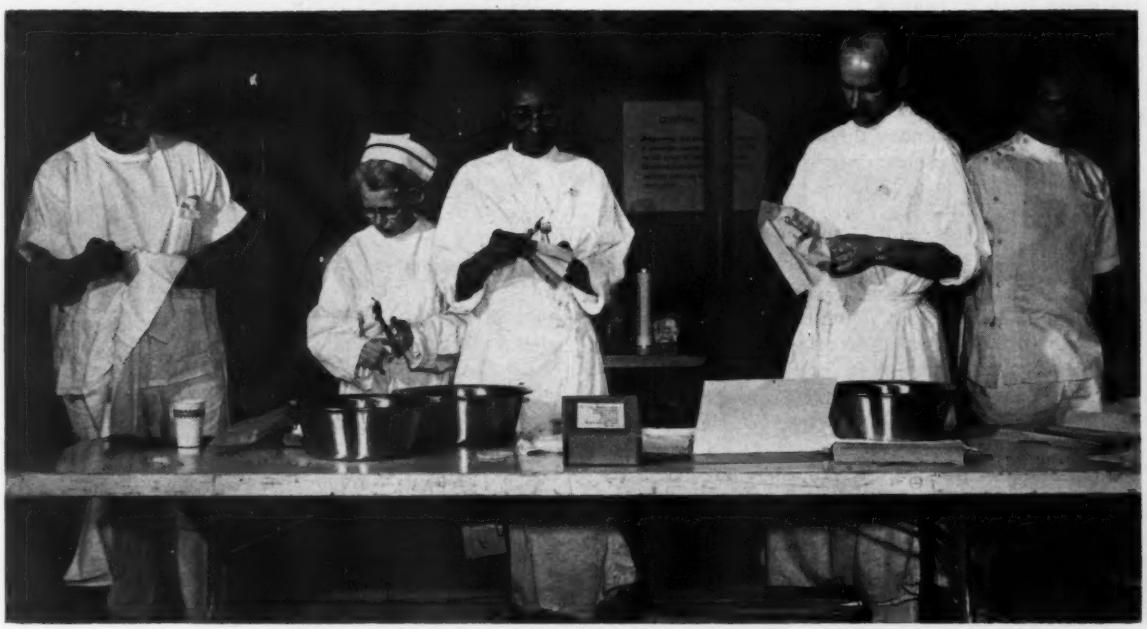


Fig. 4. Treatment ward of emergency hospital in action would look much like this training exercise at Battle Creek.

time the first patient was received in the sorting section, all had been placed for treatment.

An important part of the national courses was the teaching aids, such as wound moulages, used to make training more realistic or easier to understand. The students learned how to imitate a third degree burn with a bit of vaseline, a tissue, and the average contents of a cosmetic kit. Wound moulages are made of latex rubber colored appropriately and stuck on with rubber cement. A particularly gruesome touch can be added by imbedding glass or splinters in the moulage.

The PHS Division of Health Mobilization also is preparing course outlines and slide presentations for use in state and local courses. The technics learned will apply as well to local disasters as to national attack. Teaching materials are available from the division's training branch.

In civil defense and other disaster planning, much of what is done must be based upon presumption. America's wars have been fought elsewhere, and the lessons of natural disaster have been learned mostly by those who experienced them.

The advent of nuclear weapons and of startling chemical and biologic warfare agents has introduced new concepts into defense thinking. American military authorities have admitted possessing hydrogen bombs equal to 20 million tons of TNT and capable of destroying or damaging everything within a 20-mile radius of its impact point.

For those interested in economy, this nation, and presumably others, have developed (but never used) inexpensive biologic and chemical agents to cripple or knock out a population without damaging physical property.

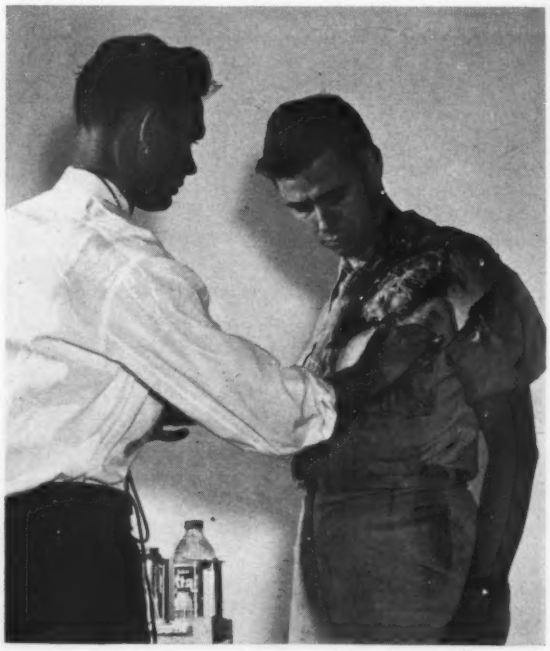
Biologic warfare actually is public health in reverse, noted Dr. Kirk T. Mosley, associate dean of the Oklahoma University School of Medicine at Norman. He pointed out that through World War I, most armies suffered far greater casualties from epidemics and sickness than from battle. American troops suffered only 243 battle casualties in the Spanish-American War, but the army had 20,738 cases of typhoid fever and 1,580 deaths from that cause.

Bacteria, viruses, fungi, and toxins can be injected cheaply into water or food supplies, sprayed into the air, or carried in the warhead of a missile.

Diseases which might be used as biologic warfare agents include anthrax, brucellosis, diphtheria, salmonella food poisoning, typhus, psittacosis, infectious hepatitis, smallpox, yellow fever, and many others.

Medical science still has a meager knowledge of

Fig. 5. The simulated burn created in minutes with cosmetics adds realism to casualty care training without discomfort to the "victim."



the effects of radiation. Studies have been limited to survivors of the Hiroshima and Nagasaki blasts, tests on animals in controlled American explosions, and victims of accidents with radioactive materials.

Nerve gases which kill in minutes by blocking cholinergic action, refinements of the dread mustard gas of World War II, and hallucinogenic agents all could be used to create panic in a city.

Panic is another threat to future warfare which concerns health planners. Many of the survivors of a nuclear blast might be expected to have what the army calls shell shock. The use of a nerve gas in a single part of a city could send panic reverberating across the nation. No one can say for certain just how Americans would react.

Thus it is simple to adopt a defeatist attitude, say that nothing can be done and do nothing. Something can always be done in natural disasters. Fortunately, there are defenses against new weapons and against their effects, just as, throughout history, one man has contrived a defense against every weapon another could invent.

There is no direct defense against an atomic bomb. Those in the immediate blast area will perish as in any explosion. Only half of the damage done by a nuclear weapon is caused by blast and shock. Another 35 per cent results from heat, and about 15 per cent may be credited to radiation. In American nuclear tests it has been demonstrated that people can remain unharmed relatively close to a nuclear blast if they are sheltered properly. Civilians can survive in a city if they seek shelter away from the shock and heat waves and stay under cover until the radiation level declines.

Public health authorities have developed serums and antitoxins against many of the biologic agents which might be used. Gas masks and impervious clothing protect to a considerable degree, even against gases which can penetrate the skin.

Once Americans accept the concept that a defense is possible against even nuclear attack, the problem becomes one of ways and means. A massive nuclear attack presumably would be directed against concentrations of people and industry. Civil defense authorities have estimated that at least a third of all Americans might be casualties. But some of that third would not be killed and the other two thirds would have the problem of restoring national life.

Primarily, the task becomes one of family survival. If enough American families can survive attack or natural disaster, then civil defense planning can become operative.

The national shelter policy proclaimed by the government in 1958 recommends that each family create a bomb shelter in the basement or other safe place and stock it with emergency provisions for 14 days. An adequate shelter should protect a family against the blast and heat of a nuclear explosion and allow it to remain under cover until the radiation has dropped to a tolerable level. The emergency provisions should keep it in good health until some resumption of city services and food supplies can be accomplished.

Then over-all disaster planning goes into effect.

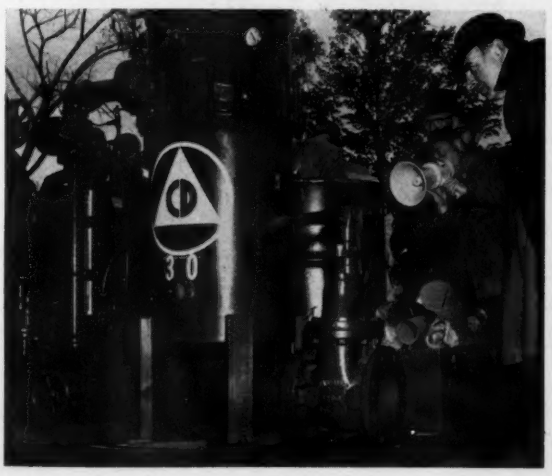
Fig. 6. The use of the membrane filter kit to determine the bacteria content of water is explained to a health mobilization course by Jerrold M. Michael of Washington, chief of training for the PHS Division of Health Mobilization.

The success of the health aspects will be dependent upon the degree to which physicians, their organizations, and their hospitals take leadership roles in preparing for all types of emergencies.

"Dependency on health agencies directly affects all community disaster planning," said Dr. Robert L. Smith of the Public Health Service in introducing the mobilization courses.

"No particular part of civil defense is the most important. The whole national or community structure depends upon the cooperation of all its levels and specialties. If one of them should fail, the whole might fail," said Dean Ridgeway of the OCDM staff college, summarizing the courses.

Fig. 7. Emergency water purification equipment is a key part of civil defense planning. The filter unit shown can produce 100 gallons of potable water a minute.



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A.O.A. publishes Journal Index 935
Recipients of Mead Johnson Grants enter year of study 936
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Department of Public Affairs 940

A.O.A. ACTIVITIES

A.O.A. publishes Journal Index

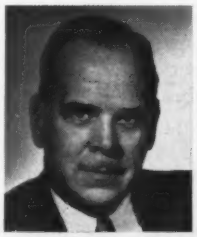
▶ Just off the press is a "Cumulative Index to THE JOURNAL OF THE A.O.A., Volumes 1 through 55," and a "Union List of Osteopathic Books Held by Osteopathic Libraries." The new volume is the same size as THE JOURNAL, but differs in the bright orange color of its cover.

The two compilations represent a major A.O.A. contribution to osteopathic literature. The work was sponsored by the Committee on Clinical Study, was produced in cooperation with the Editorial Department, and was financed in part by the Foundation for Research of the New York Academy of Osteopathy. Dr. Allan A. Eggleston, Montreal, Canada, is chairman of the Clinical Study committee, and Dr. Stephen M. Pugh, Everett, Washington, director of the index project. Both are past presidents of the A.O.A.

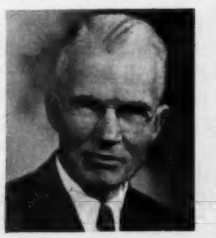
September 1901-August 1955 • The Cumulative Index, the major portion of the work, covers THE JOURNAL from the first issue in September 1901 through August 1955. It lists, by author and subject, original articles, editorials, and historical and organizational material. Multiple subject entries and cross references assure its usability. According to Committee plan, the Index will be kept current by the publication of supplements at 5-year intervals.

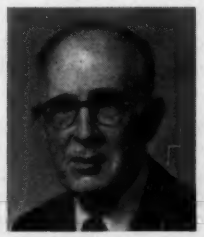
College, A.O.A. libraries • The Union List, produced in cooperation with the librarians of the six osteopathic colleges and of the A.O.A., brings under one listing books on osteopathy written by osteopathic physicians and others, and books not concerned with osteopathy written by osteopathic physicians.

"Both the Index and the Union List should prove a boon to every person interested in the history and development of osteopathy," said



Committee on Clinical Study sponsors publication—Left, Dr. Allan A. Eggleston, Montreal, Canada, Committee chairman, and Dr. Stephen M. Pugh, Everett, Washington, director of the Index Project. Both are past presidents of the American Osteopathic Association.





Journal Editors—From the left, Drs. A. L. Evans, H. L. Chiles, Cyrus J. Gaddis, and Ray G. Hulburt, whose editorships totalled 43 of the Journal's 55 years of publication. Far right, Dr. Raymond P. Keesecker, under whose editorship the Index was produced. Dr. Keesecker was Editor from 1951 until his death last April.

Dr. Eggleston. "They make available to students, historians, and research people valuable and hitherto almost inaccessible material."

Journal history • Covering as it does the first 55 years of THE JOURNAL, the Index records the development of the profession's official publication. It recalls professional leaders and undertakings that have contributed to JOURNAL development.

The first volume of THE JOURNAL contained six issues, published bimonthly. Totalling 265 pages, they included in each issue a directory of members. The issues carried no advertising, went to members as a part of the $5.00 annual membership fee, and to nonmembers for $2.00 a year. Production cost, for 500 copies, was $60.00 an issue.

THE JOURNAL's first editorial offices were in Chattanooga, Tennessee, home of Dr. A. L. Evans, the first editor. Dr. Dain L. Tasker, now retired and living in Oceanside, California, was listed on the masthead as an associate editor.

Between 1907 and 1922, when THE JOURNAL moved to Chicago, editorial offices were maintained successively in Auburn, New York, Orange, New Jersey, and New York City. Four editors, whose services totaled 43 years, were Dr. Evans, Dr. H. L. Chiles, Dr. Cyrus J. Gaddis, and Dr. Ray G. Hulburt. Under Dr. Raymond P. Keesecker, Editor from 1951 until his death last April, THE JOURNAL took on its present character and design. It was during his editorship that the Cumulative Index was produced.

Committee objectives • The Cumulative Index and Union List represent the first major publication of the Committee on Clinical Study, set up in 1953 as a subsidiary of the Bureau of Professional Education, and charged with a fourfold responsibility: to index osteopathic literature; to list clinical study activities concerned with distinctive osteopathic contributions to the management of health problems; to encourage, initiate, and record clinical studies exploring special contributions of the osteopathic profession; and to catalog portions of medical and scientific literature which contribute to the understanding and development of the principles of osteopathy.

Members of the Committee, in addition to Dr. Eggleston and Dr. Pugh, are Dr. Ira C. Rumney, Ann Arbor, Michigan; Dr. Wesley B. Larsen, Chicago; and Dr. Campbell A. Ward, Mount Clemens, Michigan.

"This Cumulative Index and Union List, completed through cooperative effort," said Dr. Pugh, "offer the opportunity to find a great deal of valuable but previously inaccessible osteopathic material. It is to be hoped that this volume will be of real service to the many facets of the osteopathic profession and to allied or related fields and professions."

Recipients of Mead Johnson grants enter year of study

► The fifth year of the Mead Johnson and Company osteopathic fellowship program opened on July 1, when nine graduates of four osteopathic colleges entered full-time 1-year training programs in osteopathic colleges and hospitals in four fields of practice. The grants, for $1,000 each, were awarded as a part of the broad Mead Johnson program of financial support to postgraduate medical education.

Annual meeting • The grants were made at the annual awards meeting of the American Osteopathic Association's Committee on Mead Johnson Grants. The meeting was held on June 26, at the Mead Johnson headquarters in Evansville, Indiana. Attending as guests of the company, with W. D. Snively, Jr., M.D., company vice president and medical director as host, were A.O.A. committee members John W. Mulford, D.O., Cincinnati, chairman; Paul van B. Allen, D.O., Indianapolis; and Joseph W. Elbert, Petersburg, Indiana. Also present were consultants Lawrence W. Mills, director of the A.O.A. Office of Education, and Walter A. Suberg, Business Manager, both of Central Office, Chicago.

The fellowships were granted to nine young physicians who have graduated from osteopathic colleges within the last 4 years. Awards were made on the basis of scholarship, financial need, and demonstrated ability in osteopathic practice. In this, as in all its other educational programs, Mead Johnson confines its participation to financial support. The program is administered by the A.O.A.

Grants increased • The number of grants was increased from six in 1959 to nine this year. The recipients, all with first grants, are taking their fellowships in four fields of practice: three each in pediatrics and internal medicine, two in general practice, and one in obstetrics and gynecology. The recipients are:

In pediatrics: Walter M. Pavlowich, 1958 graduate of the Chicago College of Osteopathy; 1959 intern at the Chicago Osteopathic Hospital; now serving his Mead Johnson fellowship there.

Gerald J. Hohn, 1955 graduate of the College of Osteopathic Medicine and Surgery, Des Moines, Iowa; 1956 intern at the Grand Rapids (Michigan) Osteopathic Hospital; now taking his fellowship at the COMS-affiliated hospital in Des Moines.

Leon O. Janis, 1956 graduate of the College of Osteopathic Physicians and Surgeons, Los Angeles; a 1957 intern at the Los Angeles County Osteopathic Hospital; now serving his fellowship there.

In internal medicine: Augustine Acosta, 1958 graduate of COMS; 1959 intern at the Dallas (Texas) Osteopathic Hospital; now on his fellowship at the Art Centre Hospital in Detroit, a CCO-affiliated hospital.

Milan Lesko, a 1955 graduate of the Kirksville College of Osteopathy and Surgery, Kirksville, Missouri; a 1956 intern at the college hospital in Kirksville; now serving his fellowship there.

Charles I. Schulman, 1957 graduate of CCO; 1958 intern at the CCO-affiliated Detroit Osteopathic Hospital; now serving his fellowship there.

General practice: Robert E. Kappler, 1958 graduate of CCO; 1959 intern at Chicago Osteopathic Hospital; now serving his fellowship there.

Walter N. Goodman, 1958 graduate of KCOS; 1959 intern at Los Angeles County Osteopathic Hospital; now serving his fellowship there.

Obstetrics and gynecology: James E. Lyster, 1958 graduate of COPS; 1959 intern at Los Angeles County Osteopathic Hospital; now serving his fellowship there.

First grants in 1955 • The Mead Johnson Graduate Education Program was instituted in 1955. The first year, three fellowships were awarded, all in the field of general practice. Three were awarded in 1957, six in 1958, and six in 1959. So far, fifteen young physicians, three with second-year grants, have completed the training. Of the number, two are women. Five of the six osteopathic colleges have so far participated in the program.

To be eligible for a grant, a physician must have graduated from an osteopathic college within the previous 4 years; must be recommended by the dean of his college, two faculty members, and the director of intern training of the hospital where he interned; and he must be willing to undertake a full-time, 1-year graduate training program in an osteopathic college or college-affiliated hospital.

COUNCIL ON FEDERAL HEALTH PROGRAMS

A.O.A. chairman testifies before House Subcommittee

▶ As chairman of the A.O.A. Committee on Colleges of the Department of Professional Affairs, Dr. George W. Northup, Livingston, New Jersey, appeared before the Subcommittee on Health and Safety of the House Committee on Interstate and Foreign Commerce at the hearings on H.R. 6906 and related bills, held at the afternoon session on June 6.

The Health and Safety Subcommittee is comprised of Kenneth A. Roberts of Alabama, chairman; George M. Rhodes of Pennsylvania; Leo W. O'Brien of New York; Paul G. Rogers of Florida; Lawrence Brock of Nebraska; Paul F. Schenck of Ohio; Samuel L. Devine of Ohio; and Ancher Nelsen of Minnesota.

Dr. Northup testified on the subject of Federal Aid for College Construction, Scholarships, and Institutional Research Grants. An extract from the Hearings follows:

Mr. Roberts: The Subcommittee will please be in order. Dr. George W. Northup, of the American Osteopathic Association, Livingston, New Jersey, will be our first witness.

Dr. Northup: Mr. Roberts, it is a privilege to be here and represent the American Osteopathic Association before this Committee.

We would like to direct our comments to the bill, H.R. 6906, and related bills. I believe for the sake of brevity and due to the fact that sometimes my epitomizations are longer than my report, that it might be wise with your permission if I read the statement.

Mr. Roberts: All right, Doctor.

Dr. Northup: My name is Dr. George W. Northup. I am an osteopathic physician engaged in active practice at 104 South Livingston Avenue, Livingston, New Jersey. My appearance here is in my capacity as Chairman of the Committee on Colleges of the American Osteopathic Association.

We are grateful to the Chairman of this Subcommittee for the opportunity of bringing to you our views on the pending bills for Federal assistance for construction of medical education facilities, scholarships for medical students, and institutional research grants.

In 1956-57 we were privileged to cooperate with your professional staff in connection with the Medical School Inquiry staff report to your Committee containing background information relating to schools of medicine, dentistry, osteopathy, and public health on the subject of Federal aid for construction of teaching facilities. The basic information contained in that report is invaluable. We shall amplify it only with current statistics.

There are six colleges of osteopathy and surgery in the United States. All are private, non-profit, tax-exempt institutions. Two are located in Missouri and one each is located in Iowa, Illinois, Pennsylvania and California. No new osteopathic college has been established since 1916. The Association does, however, have a Committee on Location of Osteopathic Colleges of which I have the honor to be chairman.

The over-all enrollment of 1,915 students at the six osteopathic colleges for the year 1959-1960 shows a decrease of 27 from the over-all enrollment of 1958-1959. The en-

tering class of 516 students in 1958 showed an attrition rate of 8.3 percent, which is the highest attrition of first-year students during the past several years. The principal cause was financial.

In 1959-1960, 505 first-year students were enrolled. These were culled from 1,800 applications by 1,417 applicants. The over-all preprofessional scholastic average of the entering classes was 1.7 or a B average. The 505 freshmen enrollment is 15 below the first-year student capacity of 520.

If Federal funds are made available on a matching basis for construction of educational facilities, present plans of the colleges for expansion of existing facilities could increase the freshman capacity to 630, or 20 percent.

The six osteopathic colleges require a minimum of three years of preprofessional study in an approved college or university. Of the 505 freshmen enrolled in the Fall of 1959, 341 had baccalaureate or advanced degrees. Others obtained B.A. or B.S. degrees after completing the first year at an osteopathic college under combined degree agreements with various undergraduate colleges and universities.

The 505 first year students enrolled in 1959 obtained their preprofessional work in 119 colleges in 38 states. Geographic distribution of the entire osteopathic predoctorate 1959-1960 enrollment shows the students derived from 47 states, Mississippi, Nevada, and South Carolina being the only states not represented at this time.

The standard curriculum of the osteopathic college requires at least 5,000 hours of professional instruction distributed over 4 college years.

Upon graduation, the degree of Doctor of Osteopathy (D.O.) is conferred. The graduate then begins an internship of 12 to 24 months in one of 93 hospitals approved for intern training by the American Osteopathic Association. Five hundred forty internships are available, of which 18 are vacant. After internship an increasing number of graduates enter on three-year terms of residency training in approved residency training hospitals, followed by two years of specialty practice preparatory to examination for certification by specialty boards in such specialties as internal medicine, surgery, radiology, obstetrics, gynecology, pediatrics, and pathology. Fifty-six hospitals are approved for residency training by the American Osteopathic Association. Three hundred ninety-four residencies are available, of which 88 are vacant.

Doctors of osteopathy are engaged in the legalized practice of their profession in all states. In my state of New Jersey, the license is to practice medicine and surgery. In 38 states and the District of Columbia, most doctors of osteopathy practice under unlimited licenses. The licensure laws in the remaining states have not kept pace with advancements in the training and practice of physicians of the osteopathic school of medicine.

In the Fall of 1958 the Surgeon General of the Public Health Service invited a group of 22 national leaders in medicine, education, and public affairs to serve as a consultant group to the Public Health Service on medical education, and specifically to consider the question: "How shall the nation be supplied with adequate numbers of well-qualified physicians?" Dr. Morris Thompson, President of the Kirksville College of Osteopathy and Surgery, had the honor of serving as a member of the group. In September, 1959, the Surgeon General's Consultant Group on Medical Education made its report, under the caption, "Physicians for a Growing America." The report points out that in the United States in 1959 there were "some 235,000 doctors of medicine and 14,000 doctors of osteopathy for a population of 177 million people, or 141 physicians per 100,000." The report then states:

> The Consultant Group considers the maintenance of the present ratio of physicians to population a minimum essential to protect the health of the people of the United States. To achieve this, the number of physicians graduated annually by schools of medicine and osteopathy must be increased from the present 7,400 a year to some 11,000 by 1975—an increase of 3,600 graduates.

According to the Consultant Group, the nation's physician supply will continue to lag behind the needs created by increasing population unless the Federal Government makes an emergency financial contribution on a matching basis toward the construction of medical school facilities.

State and local appropriations in 1958 met 70 percent of the operating expenses of public medical schools, the remaining 30 percent being made up of tuition and fees, gifts and grants, and Federal training funds. The 45 private medical schools and the six osteopathic colleges were principally dependent on tuition and fees, gifts and grants, Federal training funds and Federal grants for emphasized teaching in heart diseases, cancer, and mental health, and reimbursement for patient care.

One of the osteopathic colleges, The Philadelphia College of Osteopathy, since 1955 has received some $100,000 annually from the state appropriations for instructional grants to medical institutions in the state, but these appropriations may not be used for construction purposes. The state is also providing 1 million dollars for provision of a new teaching hospital for the college.

In 1958 the six osteopathic colleges spent 6.8 million dollars for basic operations, only 1.4 million dollars, or 21 percent of which came from tuition and fees. Gifts and grants and deficit financing supplied the rest.

The profession recognizes a continuing responsibility to the colleges. During the past 14 years Doctors of Osteopathy have contributed some 7 million dollars to osteopathic education and research. Twenty-two state societies now contribute directly through a support-through-dues program. In 1959, the profession contributed over $796,000. Recently an anonymous gift of $500,000 to endow and support a professorship at the Kirksville College of Osteopathy and Surgery was announced.

Every effort is being made on the part of the colleges and the American Osteopathic Association to obtain funds from private sources for proper maintenance of these institutions for the training of physicians (D.O.). An example of the activity of the latter is provided in the brochure entitled, "Focus on Osteopathic Education," copies of which have been fur-

nished the members of this Subcommittee.

In recommending a 10-year program of Federal grants on a matching basis for the construction of medical teaching facilities, the Surgeon General's Consultant Group on Medical Education pointed out that only with such Federal stimulus will adequate funds become available for needed construction.

There is abundant evidence of a catalytic effect of the availability of Federal matching funds. The Kirksville College of Osteopathy and Surgery was enabled to match Hill-Burton funds to build a new teaching hospital. The availability of Hill-Burton funds aided the Kansas City College of Osteopathy and Surgery in obtaining matching funds for construction of a diagnostic and treatment facility, and assisted the College of Osteopathic Physicians and Surgeons at Los Angeles in obtaining matching funds for construction of a rehabilitation facility. More recently, the college at Los Angeles received an award under the Health Research Facilities Act for construction of a research facility, and the Chicago College of Osteopathy has received an award under that Act for procurement of research equipment.

It should be pointed out that more osteopathic colleges would be able to participate in the program of the Health Research Facilities Act if matching funds could be made available for facilities used both for teaching and for research purposes.

It appears that the definition of the term "health educational facilities" as "educational and related research facilities," as that term is used in the proposed "Health Educational Facilities Construction Act of 1959," H.R. 6906, would enable grants for such combined purposes.

H.R. 6906 would add a new Title VIII to the Public Health Service Act to authorize a 10-year program of grants for the construction of new and the improvement of existing educational and research facilities at duly accredited schools which provide training leading to the degree of doctor of medicine or osteopathy.

The osteopathic colleges cannot adequately meet their needs for construction of teaching facilities without additional assistance. Much of our teaching activities are in over-crowded and obsolescent buildings. We endorse the Report of the Surgeon General's Consultant Group on Medical Education calling for Federal assistance for construction of such teaching facilities, and we favor enactment of H.R. 6906 for the purpose.

According to the Surgeon General's Consultant Group, "there must be some 12,000 admissions to schools of medicine and osteopathy in 1971," if the "minimum goal of 11,000 physician graduates a year by 1975" is to be met. Two major programs were recommended: (1) Adequate expansion of teaching facilities. H.R. 6906 is directed to that purpose. (2) Increase in funds available to make it possible to finance a medical education. H.R. 10255 and H.R. 11651 are calculated to that end, since each would amend the Public Health Service Act to authorize a 10-year program of scholarships for able students in need of financial assistance to permit the student to complete a course of study leading to a degree of doctor of medicine or osteopathy.

The average cost of tuition and fees, room and board, and other school and living expenses to the student for four years of osteopathic college is about $10,000. The student has already spent from $5,500 to $7,000 on preprofessional college training.

The American Osteopathic Association student loan program makes low-interest loans of $750 or less to junior and senior students for repayment after graduation. More than $300,000 in such loans is currently outstanding. The Auxiliary to the American Osteopathic Association offers freshmen students ten $1,000 scholarships each year. Some grants and loans are furnished by state and local societies. Pharmaceutical houses and other donors are offering increasing amounts for student assistance. The National Defense Education Act program is also helpful. But the demand for assistance far exceeds the supply.

As I have already pointed out, 1,417 applicants in 1959-1960 met minimum requirements for admission, yet there were not enough acceptable applicants to fill the freshman capacity of 520. This was so because quality is and must remain the paramount consideration. Federal scholarship aid is needed to increase the pool of available superior students.

We believe that either H.R. 10255 or H.R. 11651 would serve the purpose.

The requirement of state matching assistance and the necessary state legislation for the purpose could delay full implementation of the program under H.R. 10255.

In that connection, I am reminded that two of the states signatory to the Southern Regional Education Compact had constitutional provisions which forbade the appropriation of funds to institutions of learning not owned or controlled by the states, which had to be amended to permit the states to participate in the program. Under the Compact, states which do not have schools in the authorized fields of assistance send their citizens to the member states which do. Similar compacts are the Western Interstate Commission for Higher Education and the New England Higher Education Compact. Under these compacts the students are relieved of out-of-state fees, but as stated in the 1956 pamphlet of the Southern Regional Education Program, "the state appropriations are not in any sense scholarships."

I understand that at least 13 states now have scholarship or loan programs for medical students. In the Alabama program, all scholarships are to the University of Alabama Medical School. In New York, medical scholarships are restricted to residents of the State at medical schools within the State.

The medical scholarships law of Florida expressly provides for attendance at out-of-state colleges of osteopathy, specifying that of the ten scholarships authorized to be awarded for the study of medicine leading to the attainment of the degree of doctor of medicine, the state board of health may award one "to a qualified person selected by such board in consultation with the state board of osteopathic medical examiners for the study of osteopathic medicine in a fully accredited and approved college of

osteopathy conferring the degree of doctor of osteopathy and accredited and approved both by the American Osteopathic Association and the state board of osteopathic medical examiners," permitting the "state board of health to send one deserving person each year to study osteopathic medicine, and to require that such student when graduated shall return to practice osteopathic medicine in some community in Florida to be selected by the state board of health for at least 15 months for each year of scholarship aid he has received."

The pending bills authorize and contemplate that a resident of a state who is accepted or enrolled in a school which provides training leading to the degree of doctor of osteopathy and which is accredited by a body approved by the Surgeon General shall be eligible to compete for scholarship award by the state commission of the participating state as provided in H.R. 10255 or by the Surgeon General as provided under H.R. 11651.

Regarding the 10-year program of low-interest loans to interns as proposed under H.R. 11651, due to the long and expensive training which has preceded the period of internship and the nominal intern-stipend which the training hospital is able to pay, such a loan program should operate to relieve economic pressures and so promote the effectiveness of the traineeship, and lead to extension of the internship for additional periods.

We hope for the enactment of the bill, H.R. 10341, which would amend the Public Health Service Act to authorize a program of institutional research grants. The program would enable qualified institutions, upon application approved by the National Advisory Health Council, to provide more stable career support for scientific investigators and more initial support for promising young investigators, and to exercise more institutional over-all planning of research activities. The research potential of our colleges has been advanced materially by the research training grants and research project grants received from the National Institutes of Health.

Thank you very much, Mr. Roberts. If there are any questions that I can answer, I will be glad to try.

Mr. Roberts: Thank you very much, Dr. Northup. The Chair appreciates your statement and, so far as I can tell, it seems to me that you go along pretty well with the same view as expressed here by the Association of American Medical Colleges this morning.

Dr. Northup: That is correct.

Mr. Roberts: I would like to congratulate you on the statement, particularly in one aspect where you talk about the catalytic effect of the availability of Federal matching funds.

I think that has been the experience of this Subcommittee throughout the years, that, once the Federal government takes leadership in this field, usually private sources follow that leadership and, as a result, sometimes one Federal dollar may mean anywhere from four to six private dollars.

I feel sure that same experience will be true in this particular field.

I appreciate your appearance here and what you have added to the work of this Subcommittee.

The gentleman from Nebraska.

Mr. Brock: I have just one question, Mr. Chairman.

What is the length of term that a student must attend an osteopathic college in order to be an osteopathic physician?

Dr. Northup: Of course, he must have three years preprofessional training as was stated. Then he must attend 4 years in an osteopathic college. Then he must take his internship. Then if he wishes to go into a specialty practice he will then engage in a 3 to 5 year residency program in an approved residency.

Mr. Brock: Thank you.

Thank you, Mr. Chairman.

Bureau of Public Education on Health

Attorney discusses problems of medical testimony

▶ The following article, "Medical Testimony in the Courts," will have particular interest for doctors whose practices include a volume of personal injury cases. It was presented by its author, G. C. A. Anderson, Baltimore, Maryland, at the annual meeting of the American Bar Association last October. Mr. Anderson is a former president of the Maryland State Bar Association.

The paper was published in the October issue of the *Journal of the American Judicature Society,* and, with the publisher's permission, is reprinted here in its entirety.

▶ The advent of the automobile, the enactment of Workmen's Compensation Acts, and similar legislation have flooded the courts with personal injury cases. The value of these personal injury cases depends upon medical testimony. The plaintiff's lawyer seeks that medical testimony which will produce a maximum verdict; the defendant's lawyer seeks that medical testimony which will produce a minimum verdict.

Under these circumstances, it is inevitable that the doctor becomes a partisan along with the lawyer. The scope and importance of this testimony is self evident when it is estimated that "Seven out of ten personal injury cases are decided

on medical considerations rather than legal."[1]

This demand for medical testimony has brought in its wake the so-called medical expert. This medical expert is not the attending physician. He is not employed to treat the patient, but to testify for the patient. The reason for his employment is his value as a witness —not his skill as a physician. He is a paid partisan witness. As stated by David W. Peck, then Presiding Justice of the New York Supreme Court, Appellate Division, First Department:

> The system of presenting such testimony only through doctors retained by the parties and paid as medical mouthpieces has given rise to serious abuses and created grave doubts as to whether courts and juries are receiving reliable guidance in a field where they are dependent on experts. The doctors retained by parties are obviously partisan. They are selected not for their medical qualifications or objectivity but principally for their personality and manner of testifying, their jury appeal. When, as often happens, the medical views expressed at the trial are as one-sided and far apart as the parties' differences as to how the accident happened, the jury is left hopelessly confused.[2]

These medical experts are divided into two classes—plaintiffs' experts and defendants' experts.

The expert witness is personable and engaging. The jury is duly impressed by his manner and his background, and thoroughly confused when two such eminent experts, representing opposing parties, seem to be talking about two different injuries, incurred by the same claimant in the same accident. The jury's dilemma is summed up in a recent magazine article as follows:

> A large self-confident man enthrones himself in the witness chair. Yes, he is a doctor specializing in diseases of the heart; he has written books; he has lectured to a generation of medical students. His expert professional opinion echoes utmost conviction: The fall from the ladder damaged the man's heart.
>
> Later a brisk, incisive witness for the defense, boasting equally impressive medical credentials, contradicts this conclusion. "Impossible," he says, "that a sound heart should be damaged by a blow that did not even raise a bruise." He is positive that a man with a diseased heart climbed a ladder, suffered an attack and consequently fell.
>
> Neither doctor ever saw the deceased. Each was hired not for his skill as a physician but for his value as a witness. If either had reached a different conclusion, he would not have been called. You could decide either way with equal justice—or lack of it.[3]

Extreme differences in expert opinion are a common incident of today's trials.

> Expert opinions do not always diverge to the extent of 100%. But opinions expressing differences as great as between 30% and 70%; 15% and 85%; or 'substantial' and 'minimal' are heard every day.[4]

Nor can this consistent discrepancy be dismissed as mere errors in diagnosis.

> It seems to be a fact that the two opposing medical experts quite often disagree sharply in their testimony concerning cause and consequence of the injury. Such disagreement could, theoretically, derive from two sources; some bias on the part of the examining physician or the inherent difficulties of accurate medical diagnosis. This latter possibility, though, must be less important, since the divergence occurs invariably in the same direction—the defendant's physician never sees as serious a liability as his counterpart. . . . Whatever the reason for this divergence, the present situation, in which the divergence tends always in the direction of the party who pays the witness, is deplorable and patently not intended by the law.[5]

The problem of the medical expert was early recognized by both the legal profession and the medical profession.

In 1926, Judge Taft—later Mr. Chief Justice Taft—made certain suggestions with reference to law reform. One of the suggestions was the appointment of a court-appointed expert, "which suggestion might conveniently be embodied in an Act of Congress."[6]

Model Act of 1937 • To meet this problem, the National Conference of Commissioners on Uniform State Laws approved the Model Expert Testimony Act in 1937 and in 1943 redesignated it as a Model Act. The reason for this was summed up in a prefatory note which said:

> Parties consistently employ experts upon the strength of their bias, which may range from a professional prejudice to naked perjury.
>
> There can be no doubt of the need for expert testimony. The problem is how to eliminate the evils of bias and partisanship which shape it.[7]

Section (1) of this Act empowered the Court to appoint expert witnesses whenever "the Court deems expert evidence is desirable."[8]

The reasons for the act are even more valid today, even though the act itself seems antiquated in this day of discovery procedures, pretrial conferences, and other procedures designed to change a trial from a sporting event to an accurate appraisal of the facts involved in a legal controversy.

Expert Medical Testimony Plans • In furtherance of the intent and spirit of this act, and as a result of the dissatisfaction with, and inaccurate nature of, medical testimony in personal injury cases, two well integrated plans have been developed to cope with this problem.

One plan is usually designated as the New York Plan, the other, the Minnesota Plan. Both plans seek the same results but approach the problem by different methods.

The Minnesota Plan is predicated on disciplinary action after the fact. The New York Plan seeks to insure impartial testimony before the fact. The New York Plan is often associated with the so-called Baltimore Plan.

Minnesota Plan • The Minnesota Plan was outlined by Dr. Ernest M. Hammes, Chairman, Medical Testimony Committee, Minnesota State Bar Association, at a regional meeting of the American Bar Association held in Baltimore in 1956.[9]

It is primarily a plan whereby charges may be brought against a physician for alleged biased or improper testimony after the testimony has been given and the case tried. These charges are heard by a panel of doctors. If the panel finds that biased or improper medical testimony has been given, the testimony is discussed with the offending doctor by a member of the board. The panel does not have the power of revocation but in extreme cases can send the matter to the State Board of Medical Examiners.

The plan was initiated in 1940 and has been followed by the Illinois State Medical Society, the Chicago Medical Society, and the Harris County Medical Society (Texas). In addition, the Louisiana State Medical Society and the Wisconsin Medical Society have worked with their state bar associations in connection with the re-

view of medicolegal testimony. In the State of Washington, the Medical Disciplinary Board Act provides for the review of medical testimony by the disciplinary board.[10]

As of the date of Dr. Hammes' paper only one case had been forwarded to the State Board of Medical Examiners, but in a number of cases, the medical testimony of physicians has been discussed with members of the panel. Although the plan has received widespread publicity, it has not been successful. Interest in the last few years has shifted from the Minnesota Plan to the New York Plan.

New York Plan • A program is now in operation. Originally sponsored by the justices of the Supreme Court for the County of New York, the Association of the Bar of the City of New York, New York County Lawyers Association, New York Academy of Medicine and New York County Medical Society, this program obtained a grant of $40,000 from the Alfred P. Sloan Foundation and the Ford Motor Company Fund. The New York Law Journal in giving the reasons for the plan stated:

> The project is prompted by the dissatisfaction of the Supreme Court Justices with the conflicting medical testimony which is given by the experts retained by the parties and the need for having medical examinations and reports which are both authoritative and impartial.
>
> Because of their distaste for hiring themselves out as partisan experts, and because of the time which a court appearance consumes, many of the best qualified doctors have tended to stay clear of involvement in litigation. But leading medical men have indicated their willingness to respond to a call from the court and to aid in the administration of justice as impartial experts.[11]

Under this program sponsored by the courts, the medical profession and the bar, there was established:

> . . . a panel of independent experts, of the highest standing, who would be available to respond to a call from the court for truly expert and objective medical findings on conflicting medical claims. The stated requirements for panel membership were that the doctors should be top authorities in their branches of medicine and men who were not previously identified particularly with the plaintiff's or defendant's side of personal injury litigation. The responsibility of selecting the members of the panel was delegated to a joint committee of the New York Academy of Medicine and the New York County Medical Society.[12]

A panel of doctors was selected, and the Appellate Division promulgated a special rule effective December 1, 1952.[13]

The rule is only evoked when there is a sharp dispute as to the nature and extent of the plaintiff's injuries, and it appears to the judge that a report by an impartial medical expert would be helpful. This dispute invariably appears in pre-trial conferences. Arrangements are made to have the plaintiff examined, and copies of the doctor's report are forwarded to the attorneys for all parties and to the court. The matter is then discussed at a subsequent pre-trial conference.

Although cases involving impartial experts are hard core cases, cases that the regular pre-trial procedure had failed to settle and if tried would take longer than the ordinary case to try, former Presiding Justice of the Appellate Division, David W. Peck in reporting on the effect of the rule said:

> Approximately 575 cases have gone through the New York referral procedure. Settlements at a pre-trial stage, attributable to the panel procedure, were made in 330 cases. Settlements during trial were made in another 62 cases, while 68 cases were tried to completion. There remain 115 cases awaiting trial or other disposition. It may fairly be assumed that at least half of those cases will still be settled, bringing the total number settled to 75 per cent of the number of cases referred.[14]

This, of course, might have been anticipated, since use of the rule dissipates and minimizes the disagreement over the nature and extent of the injuries.[15]

He further pointed out that the testimony of impartial experts has been accepted by both plaintiffs' and defendants' attorneys. In cases where impartial experts have testified, they were called by the plaintiff in 35 cases, by the defendant in 39 cases and by the court in only one case.[16]

This plan has proven so successful that it is no longer supported by a grant but is supported by public funds.

Baltimore Plan • The creation of the Baltimore Plan, unlike the New York Plan, was accidental. The president of the Baltimore City Bar Association and the president of the Maryland State Bar Association appointed three identical committees, with identical members on each committee, to consider the mutual problems of doctors and lawyers.

The Medical and Chirurgical Faculty of the State of Maryland was then contacted. The Medical and Chirurgical Faculty of the State of Maryland represents practically all the doctors in Maryland.

These committees held symposiums on subjects that were of interest to both lawyers and doctors as well as the public. At the second symposium entitled "The Doctor in Court—Expert Medical Testimony,"[17] Dr. Conrad Wolfe, Professor of Medicine at the University of Maryland and a member of the Occupational Disease Board of the State of Maryland, suggested that the Medical and Chirurgical Faculty prepare a panel of impartial experts for use in judicial proceedings. He further stated that it was the civic duty of physicians to serve on this panel.

Immediately following this suggestion, one of the joint committees of doctors and lawyers began working on such a plan. It was first believed that special legislation would be necessary to put such a plan into effect. After further study, the committee decided that no statute was necessary, and that Discovery Rule 420 contained the necessary power to put the plan into operation. The rule is similar to Rule 35 of the Federal Rules of Civil Procedure. This rule provides:

> Whenever the mental or physical condition of a party is material to any matter involved in any proceeding, the Court may, upon motion by any party and notice to all other parties, for good cause shown, order such party to submit to a mental or physical examination by a physician or physicians. The order (1) shall specify the time, place, manner, conditions and scope of the examination and the person or persons by whom it is to be made and (2) may regulate the filing of a report of the findings and conclusions and the testimony at the trial by the examining physician or physicians, the payment of the expenses of the examination and any other relevant matters.[18]

There is nothing so new and revolutionary about this rule and

its application to the appointment of a court-appointed expert. The rule had its foundation in Maryland case law. As early as the case of *United Railways and Electric Co.* v. *Cloman,* 107 Md. 681 (1908), the right of the court to order a physical examination of a claimant was recognized. The rule itself was specifically upheld in *Purdum* v. *Lilly,* 182 Md. 612 (1944).[19]

Outstanding Specialists Serve on Panel • Next came the creation of a panel of experts. This was done by the Medical and Chirurgical Faculty. The panel is divided into twenty-one specialized sections, such as anesthetics, blood, cancer, cardiology, etc., with three doctors in each section. Every effort was made to obtain the most outstanding specialists for each section.

The judge who desires an expert calls the executive secretary of the faculty, explains the medical problem involved and is given the names of the three specialists in the appropriate section.

The lawyers in the case are asked to agree upon one name. If they cannot agree upon one name, the court chooses the particular specialist who will be used from the three names given him.

Under the rule, the complete reports of the court appointed experts are delivered to the court and counsel for both sides sufficiently before trial so that both sides can study them and take any necessary action.

The question of costs for services rendered by panel members was a matter of some difficulty. It was determined that the question of costs should rest in the sound discretion of the court. The court may demand costs in advance or tax the same after the case is over.

The objections to the plan were—it would be used in small damage suits and unnecessarily delay and complicate these cases, it would restrict the right of cross examination of the court-appointed expert, and it would withdraw the medical issues from the realm of adversary proceedings. In answer, it can be pointed out that on the contrary the plan is for use in big cases where great divergence in medical testimony is expected. Under the plan, the court-appointed expert is subject to cross examination to the same extent as any medical witness. If anything, the plan should improve the adversary system by enabling the triers of fact to weigh more intelligently the evidence before them.

Even though the plan was not immediately known or understood and has not yet been accepted by the state or city bar associations, its existence and use has facilitated the settlement of cases. In fact, in the last few years there has been a gradual increase in its use and a rather definite increase within the last year.

Further Development • In addition to the Minnesota, New York and Baltimore City Plans, the California Code of Civil Procedure Section 1871 provides for the appointment of an expert whenever it shall appear that "expert evidence is, or will be required by the court." After a three year study of the Superior, Municipal and Justice Courts of Los Angeles County, the Holbrook Survey, sponsored by the American Bar Association, recommended:

> For a period of at least one year, the Superior Court should experiment with the use of impartial expert medical testimony as a regular program in personal injury cases, and the results thereof should be carefully studied and evaluated.[20]

Even though the medical association has supplied the courts of Los Angeles County with panels of physicians in the various medical specialties to be used in accordance with Section 1871, the courts because of a lack of funds have not made use of their powers under this section; however, the California legislature in its last session authorized the payment by the county of court-appointed experts in Los Angeles county upon the approval by the county board of supervisors. Although the board has not acted, it is expected that the board will soon give its approval.

In the Eastern District of Pennsylvania, the United States District Court on June 2, 1958, adopted a rule in personal injury cases providing for the use of impartial medical experts whenever their use would aid the court in the just determination of the case. Under the rule, the doctors are appointed by the court from a panel designated by the Medical Society of Pennsylvania.

The rule was immediately attacked on constitutional grounds, but was upheld as within the power of the district court by the United States Court of Appeals. Further appeal was denied by the Supreme Court when it refused to grant certiorari.[21] Although a denial of certiorari is not a decision on the merits, the Supreme Court's failure to rule on this important issue along with the decision of the Court of Appeals approving the rule indicates that at least the federal courts have the power by rule of court to use court-appointed experts.

After considering the matter for several years, the American Bar Association's House of Delegates adopted the following resolution of the Section of Judicial Administration at its 1957 annual meeting:

> RESOLVED, That the American Bar Association adopt a national program, to be implemented at the local level, of fostering the creation and employment of panels of impartial medical experts, under court aegis, in the pre-trial consideration and trial of personal injury cases especially in those communities where there is a sufficient number of qualified doctors available to constitute a panel;
>
> That the panel be selected by professional bodies on the basis of professional qualifications;
>
> That the panel be employed at the pre-trial and trial stage of such cases.[22]

Benefits of Court-Appointed Medical Expert System • The resolution was based upon the Section of Judicial Administration's findings that the system of court-appointed medical experts have the following beneficial results:

1. It improves the process of finding the medical facts, vastly increasing the likelihood of reaching the right result.
2. It serves to relieve court congestion by bringing about the settlement of many cases which would otherwise have to be tried and which by their nature would entail lengthy trials.
3. It has a prophylactic effect upon the formulation and presentation of medical testimony in court.
4. The modest cost involved in the payment of independent experts is a positive economy in effecting a large saving in court operations.[23]

Opposition to the plan seems to stem primarily from plaintiffs' attorneys.[24] This opposition is clearly

set forth by Mr. Emile Z. Berman[25] and Mr. Harry Gair,[26] in a panel discussion conducted by the Insurance Section of the American Bar Association, and by Mr. Paul Berman[27] in a discussion on this subject at the 27th Judicial Conference of the Fourth Circuit at Asheville on July 8, 1957.

This opposition is primarily based on two premises—

(a) That a trial is an adversary proceeding; that a court-appointed expert removes the trial from adversary proceedings into the realm of an administrative proceeding determined by the testimony of court-appointed specialists; "that it is the abolition of jury trials in personal injury litigation";[28] and

(b) That medicine is not an exact science; that a court-appointed doctor can be as wrong as any other doctor; that this is particularly true in certain fields of medicine wherein there is a strong diversity of opinion among the doctors themselves.

It should be noted that Mr. Emile Berman, and, to some limited extent, Mr. Gair, in the panel discussion before the Insurance Section, concede the fact that the use of a court-appointed expert is helpful in pre-trial proceedings and may be helpful in the final disposition and settlement of cases. Mr. Gair states:

I agree with Mr. Berman that it has its place as part of a pre-trial procedure in mediating between antagonistic claimants. The opinion of a third impartial specialist would be a powerful adjunct toward compromising the conflict.[29]

Mr. Berman would seem to indicate that the use and value of a court-appointed expert varies with the medical problem involved. Some medical problems may be subject to greater certainty in medical findings and diagnosis than others. The greater the certainty in medical findings, the greater the value of court-appointed experts—the less the certainty in medical findings, the less the value of the court-appointed expert.

I believe it justifiable to state that the problem of x-ray interpretation may readily yield in the quest for certainty by reason of the development of roentgenology as a specialty. Through proven techniques and the fairly concise field that it occupies, it is probable that orthopedic problems, being in a large measure mechanic, may readily lend themselves to a fair and accurate diagnosis and evaluation from a highly competent and disinterested expert. But then here the legitimate area of disagreement may well be foreseen.[30]

Both feel strongly that medical experts should not be appointed by the court in a case in which there is a recognized division of medical opinion.

Mr. Berman:

I think medicine itself recognizes that there are fields of medical thinking where there are recognized divisions of opinion. It is my view that minimally the medical societies should delineate and define the area of conflicting schools of medical thought. In these controversial fields of medical thinking no case should be sent to the panel for any purpose, whether pre-trial or trial.[31]

In discussing this phase of the matter, a special committee of the Association of the Bar of the City of New York stated:

This point of view overlooks several important facts. First, while it is true that there are many areas of medicine where the knowledge of doctors is sketchy and uncertain, there are also many areas of certainty where competent doctors do not disagree. If the diagnosis of an injury is certain, that fact should be made known to the jury. If it is uncertain and doubtful in view of the limitations of medical knowledge, that fact is more likely to be admitted on the witness stand by a doctor who is truly expert and truly impartial than by a partisan doctor.[32]

In considering this opposition to the plan, it should be noted that discovery proceedings and right to take depositions with practically no limit on the scope of the inquiry also remove a case to some extent from an adversary proceeding. The plan is essentially a further extension of discovery proceedings.

The use of a court-appointed expert does not remove the proceedings from adversary proceedings but adds an additional skill or aid to the court in its fact-finding function in adversary proceedings. It enables the court and the jury to more accurately evaluate the facts in these proceedings.

It is believed the plan should at least be tried. If it proves of no value, it can be dropped. If it needs amendment, amendment can be made. If it proves of real value, then an addition has been made to the trial of the hard personal injury cases.

1. Small, Law Schools need to be given a Shot of Medicine, 41 A.B.A.J. 693 (1955); Peck, Court Organization and Procedure To Meet the Need of Modern Society, 33 Ind. L.J. 15 (1958).

2. Peck, A Successful New Plan: Impartial Medical Testimony, 42 A.B.A.J. 931 (1956).

3. Reader's Digest, November 1956, p. 134.

4. Niles, 29 Del. S. Medical Ass'n. 247 (1957).

5. Zeisel, Book Review, 8 Stan. L. R. 735 (1956).

6. Report of Standing Committee on Jurisprudence and Law Reform, 51 A.B.A.Rep. 435-441 at 437 (1926).

7. 9 U.L.A. Misc. Act 429-439; See pps. 429-430 for discussion.

8. A similar provision is found in rule 403 Model Code of Evidence p. 202 (1942); See also: Fed. R. Civ. p. 35 (a); Compilation of Cases and Statutes, 63 Yale L.J. 1023 (1954).

9. The Daily Record (Baltimore), May 18, 1957.

10. American Medical Association Journal, April 14, 1956, p. 1334.

11. New York Law Journal, November 25, 1952.

12. Peck, Impartial Medical Testimony, 22 F.R.D. 23 (1959).

13. In any personal injury case in which, prior to the trial thereof, a justice shall be of the opinion that an examination of the injured person and a report thereon by an impartial medical expert would be of material aid to the just determination of the case he may, after consultation with counsel for the respective parties, order such examination and report, without cost to the parties, through the Medical Report Office of the Supreme Court, New York County. The examination will be made by a member of a panel of examining physicians designated for their particular qualifications by the New York Academy of Medicine and New York County Medical Society. Copies of the report of the examining physician will be made available by the clerk of the Medical Report Office to all parties, New York County Supreme Court Rules, 22 F.R.D. 24 (1959).

14. Peck, Supra note 12, at 24.

15. *Impartial Medical Testimony*, by Association of the Bar of the City of New York, New York. Macmillan Company, 1954 ix and 188 pps. See pages 28-35 for discussion.

16. Peck, Supra note 12, at 25.

17. The Doctor in Court—Expert Medical Testimony, 13 Maryland L.R. 283-323 (1953).

18. Rule 420, Maryland Rules of Procedure, 9 Maryland Anno. Code (1957 Ed.).

19. For other Maryland cases see: *Scheffler* v. *Lee*, 126 Md. 373 (1915); *Brown* v. *Hutzler*, 152 Md. 39 (1927).

20. Fussel, The Holbrook Report 55 (August 1951).

21. *Hankerson* v. *Van Dusen*, 3 L. Ed. 2d. 628, 79 S. Ct. 608 (1959).

22. 82 A.B.A.Rep. 184 (1957).

23. Mimeographed report of Committee on Impartial Medical Testimony, Section of Judicial Administration page 4 (August 1956), Findings published 22 F.R.D. 26 (1959).

24. Editorial, 20 NACCA L.J. 25-31; Edward S. Levy, Paper before regional medicolegal meeting sponsored by the A.M.A., Washington, D.C., March 21, 1959.

25. Proceedings Section of Insurance (Panel Discussion) 293 (1956).

26. Ibid at 299.

27. Berman, Daily Record (Baltimore), June 22, 1956.

28. Berman, Daily Record (Baltimore), June 22, 1957.

29. Supra note 25, at 299.

30. Supra note 25, at 295.

31. Supra note 25, at 298.

32. Supra note 15, at 33.

This section is published monthly to inform the practicing physician about new drug products and medical equipment made available on the market. It is a reference section prepared by THE JOURNAL *from descriptive material furnished by ethical manufacturers. The American Osteopathic Association does not necessarily advocate the use of these products nor disapprove any product not included. The purpose of the section is to provide trustworthy information in a convenient form.*

NEW PRODUCTS

DEPINAR

Chemistry • Depinar is a brand of repository vitamin B_{12} (cyanocobalamin), complexed with zinc and tannic acid, and prepared for intramuscular injection. The preparation combines a slowly dissolving form of vitamin B_{12} with an adequate amount of the free vitamin to provide immediate and prolonged effects.

Pharmacodynamics • After injection of Depinar a prompt elevation in serum vitamin B_{12} occurs and reaches a peak in about 8 days, with some elevation persisting as long as 28 days. The elevation can be maintained without excessive loss of the vitamin through urinary excretion.

Absorption; fate; excretion • In contrast to the usual B_{12} preparations, urinary excretion of Depinar is delayed; no vitamin B_{12} is found in the urine during the first 24 hours, and only a trace thereafter.

Toxicology • No side effects or toxic reactions have been noted with the use of Depinar according to prescribed methods.

Indications • Depinar is indicated in the treatment of pernicious anemia, tropical and nontropical sprue, and in the macrocytic and megaloblastic anemias, as well as such ailments as anorexia and apathy, bursitis, hepatitis, alcoholic delirium, and neuritis. It is useful in geriatric cases, improving appetite, preventing and treating fatigue, and possibly preventing cerebral deterioration. It is also useful in the routine management of altered nutritional needs in pregnancy.

Contraindications • There are no known contraindications to the use of Depinar, either independently or as an adjunct to other treatments.

Dosage schedule • Depinar is injected intramuscularly, preferably in the gluteus maximus. The average dose is 1 cc. (equivalent to 500 mcg. vitamin B_{12}) every 2 weeks. According to the individual case, however, the dosage may vary from 0.5 cc. every 1 or 2 weeks to 1 cc. weekly. Suggested maintenance dose is 1 cc. monthly.

How supplied • In 5-cc. multiple-dose vials each containing 2,500 mcg. vitamin B_{12} in repository form. Each package contains 1 vial of lyophilized Depinar and 1 vial of Depinar Diluent (sodium chloride injection, U.S.P.).

Manufacturer • Armour Pharmaceutical Company, Chicago 90, Illinois.

References • Kimball, H. E., Southwest. Med. Mag. 40: Dec. 1959. Thompson, R. E., and Hecht, R. A., Am. J. Clin. Nutrition 7:311-317, 1959.

MYSOLINE,® 50-MG. TABLET

Chemistry • Mysoline is a brand of primidone, now available in 50-mg. tablets to facilitate dosage adjustment in selected cases of grand mal and psychomotor attacks.

Pharmacodynamics • Mysoline is an effective anticonvulsant with a wide margin of safety. Extensive clinical studies have established its value in the treatment of epilepsy, particularly in the control of grand mal and psychomotor attacks. The drug is a pyrimidine derivative structurally resembling phenobarbital but with different chemical and pharmacologic properties. Its maximum effect is reached between 3 and 6 hours after a single oral dose.

Absorption; fate; excretion • Mysoline is rapidly absorbed, the maximum blood level being attained in 1 hour. Studies in experimental animals indicate that both the liver and kidney are important for the breakdown and elimination of Mysoline, in contrast to phenobarbital which involves the liver principally.

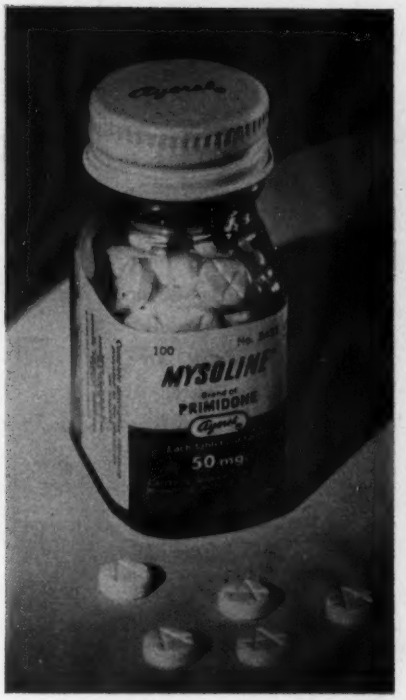
Toxicology • Acute and chronic toxicity studies in animals have shown Mysoline to be of relatively low toxicity; the therapeutic ratio was found to be at least 50:1. Phenobarbital was 20 times as neurotoxic as Mysoline. Clinically, no serious irreversible toxic reactions have been observed. The occasional appearance of megaloblastic anemia is readily reversible by folic acid therapy. Side reactions are usually mild and transient, tending to disappear with continued therapy or adjustment in dosage. The most commonly reported side effects are drowsiness, ataxia, vertigo, anorexia, irritability, general malaise, nausea, and vomiting.

Indications • Mysoline is indicated for the control of grand mal and psychomotor seizures.

Precautions • As with any drug used over prolonged periods, it is recommended that routine laboratory studies be made at regular intervals.

Dosage schedule • The new small-potency 50-mg. Mysoline tablet may be of particular value in selected cases for initiation therapy, notably in children and in cases where drowsiness is a complication; for combination and transfer therapy where small upward and downward adjustment of dosage may be necessary; also as additional support in times of stress. The usual dosage with the 50-mg. tablet, for either adults or children, is 1 tablet daily, increasing as tolerated and as required. When the daily dosage exceeds 200 mg. (4 tablets), the regular 250-mg. tablet is suggested. The suggested dosage with the 250-mg. tablet, for adults and for children over 8 years old, is 1 tablet daily, preferably at bedtime, for 1 week. The dosage is increased by 1 tablet weekly until control is established. A dosage exceeding 2 grams daily is not recommended. For children under 8, the dosage starts with one-half tablet (125 mg.) daily, increasing by one-half tablet weekly until control is achieved. If a smaller starting dose is required, the 50-mg. tablet should be used.

Note: In patients already on other anticonvulsant therapy, Mysoline is gradually added to the regimen while the dosage of other

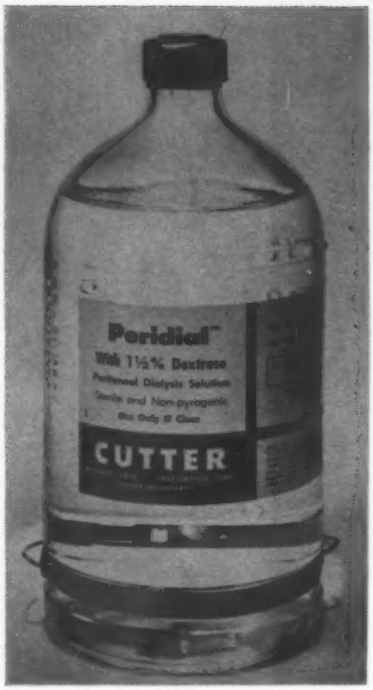


drugs is gradually reduced. When therapy with Mysoline alone is the objective, the transition should be carried out over a period of at least 2 weeks.

How supplied • Mysoline 50-mg. tablet, No. 3431, scored tablets in bottles of 100 and 500. Mysoline regular tablet, No. 3430, 250-mg. scored tablets in bottles of 100 and 1,000. Mysoline suspension, No. 3850, 250 mg. per 5 cc. (teaspoonful), bottles of 8 fluid ounces.

Manufacturer • Ayerst Laboratories, New York 16, New York. (Mysoline is available in the United States by arrangement with Imperial Chemical Industries, Ltd.)

References • Bogue, J. Y., and Carrington, H. C., Brit. J. Pharmacol. 8:230, 1953. Swinyard, E. A., Tedeschi, D. H., and Goodman, L. S., J. Am. Pharm. A. (Scient. Ed.) 43:114, 1954. Bogue, J. Y., presented before Third Internat. Cong. Electroencephalog. and Clin. Neurophysiol., Boston, August 1953. Lambert, N. H., Vet. Rec. 6:123, 1953.



PERIDIAL ™

Chemistry • Peridial is a brand of peritoneal dialysing solution in two forms, one containing 1.5 per cent dextrose and the other containing 7.0 per cent dextrose. Each 100 cc. of solution provides electrolytes in the following amounts: sodium chloride 0.565 gram, calcium chloride 0.0294 gram, magnesium chloride hexahydrate 0.0153 gram, sodium lactate, anhydrous 0.488 gram, dextrose 1.5 grams or 7.0 grams; sodium bisulfite added 0.006 per cent or 0.0104 per cent; pH adjusted to 5.6 with lactic acid.

Pharmacodynamics • The improved technic for peritoneal dialysis uses the peritoneal lining as a dialyzing membrane, and dialyzable wastes or excess electrolytes are passed out of the plasma into the Peridial solution and removed through an abdominal catheter. The newly developed closed system of infusion and drainage, and the carefully formulated electrolyte composition of Peridial, have greatly reduced the complications of earlier methods, such as peritonitis, drainage difficulties, and electrolyte imbalances.

Toxicology • Incorrect use of the method may result in edema, hypovolemia or hypervolemia, and dehydration; if this happens, electrolyte and fluid balance should be restored according to the patient's needs.

Indications • Intermittent peritoneal lavage is indicated when conservative therapy fails to maintain normal or tolerable physiologic function in the patient with acute renal failure. Notable reasons for its use are hyperpotassemia and marked overhydration, particularly pulmonary edema. Hemodialysis has been used successfully in barbiturate poisoning and poisoning by other systemic dialysable agents (bromide salicylate glutethimide). Use of Peridial for chronic renal disease is at the discretion of the physician; however, instances have been reported in which apparently irreversible renal disease proved to be at least partially reversible following dialysis.

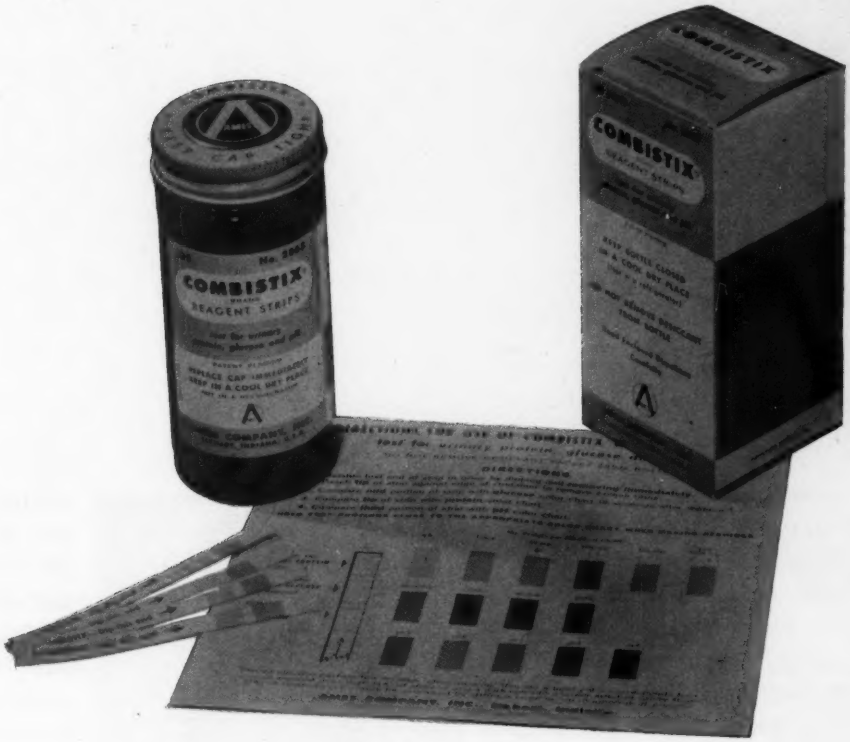
Contraindications • Infection of the peritoneal cavity is an absolute contraindication to peritoneal dialysis; recent or extensive abdominal surgery is a relative contraindication. Although the procedure for intermittent peritoneal dialysis is relatively simple, it is advisable to arrange for the usual signed permission for a surgical operation.

Dosage schedule • Two liters of irrigating fluid are introduced into the peritoneal cavity with each exchange. A liter or less may be sufficient for a small child. The Peridial administration set is arranged for the administration of 2 liters. A dialysis usually requires from 20 to 25 exchanges (i.e., 40 to 50 liters of Peridial) and takes from 12 to 36 hours.

How supplied • Peridial with 1.5 per cent dextrose, 1,000 cc.; Peridial with 7 per cent dextrose, 1,000 cc.

Manufacturer • Cutter Laboratories, Berkeley, California, and Chattanooga, Tennessee.

References • Maxwell, N. H., and others, J. Am. M. A. 170:917-924, 1959. Doolan, P. D., and others, Am. J. Med. 26:831-844, 1959.



COMBISTIX ®

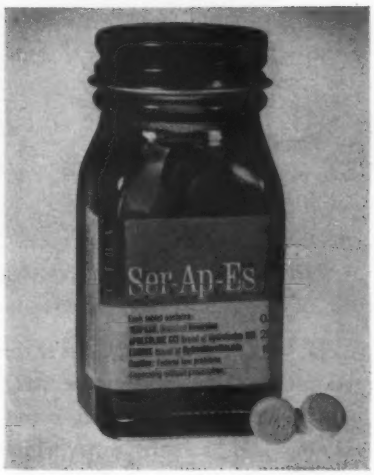
Description • Combistix Reagent Strips have been designed for the simultaneous colorimetric determination of urinary protein, glucose, and pH. The simple, 10-second, dip-and-read test makes use of the principle of the "protein error of indicators" for the detection of protein, the enzyme reactions for the detection of glucose, and two indicators selected for their ability to span the urine pH range. The protein test area of the paper strip is the yellow (tip) portion, containing tetrabromphenol blue, citrate buffer, and a protein-adsorbing agent. The glucose test area is the red (second) portion of the strip, containing glucose oxidase, orthotolidin, and a substance which catalyzes the reaction of peroxide and orthotolidin. The pH test area is the orange (third) portion; the indicators are methyl red and bromthymol blue. Water-impervious barriers separate the three test areas from each other. The test is performed by dipping the impregnated end of the strip into a urine sample and comparing each of the three test portions of the strip with the corresponding standardized color chart which provides points of reference for consistent recording. Investigators have reported that all three tests are accurate and reliable as compared with other laboratory methods.

Indications • Combistix is ideal for rapid testing of all patients in the office and for use by the laboratory in routine urinalysis.

How supplied • Combistix Reagent Strips, bottles of 125.

Manufacturer • Ames Company, Inc., Elkhart, Indiana.

Reference • Fetter, M. C., Rebar, J., and Metzler, I., Am. J. Med. Technol., Nov.-Dec. 1959, pp. 401-407.



SER-AP-ES ™

Chemistry • Ser-Ap-Es combination tablets contain Serpasil (reserpine) 0.1 mg., Apresoline hydrochloride (hydralazine hydrochloride) 25 mg., and Esidrix (hydrochlorothiazide) 15 mg.

Pharmacodynamics • Serpasil is a pure crystalline alkaloid of rauwolfia which exerts gradual and sustained antihypertensive effect as well as calming and heart-slowing effects; it is generally well tolerated and especially useful in mild essential hypertension. Apresoline is the only therapeutically acceptable agent which can increase renal blood flow while reducing blood pressure; it also tends to produce relaxation of cerebral vascular tone without reducing cerebral blood flow in hypertensive patients. The action of Apresoline is largely central and involves no sedative component; it has an inhibitory influence against the pressor actions of angiotonin (hypertension), serotonin, pherentasin, and possibly other endogenous factors implicated in the causation of hypertension. Esidrix is reported to be the most effective oral diuretic known, 10 to 15 times as active as chlorothiazide, and to have a therapeutic efficacy comparable to parenterally administered mercurials. It is also useful as an antihypertensive agent, alone or in combination with other drugs. Esidrix potentiates the effects of

Serpasil and other rauwolfia derivatives, Singoserp, Apresoline, the veratrum alkaloids and ganglionic blockers, as well as enhancing the antihypertensive effects of surgical sympathectomy. The combination of the three agents in Ser-Ap-Es has an antihypertensive activity greater than the total effect of the three drugs used separately.

Toxicology • As with any antihypertensive agent, Ser-Ap-Es should be used with caution in patients with coronary artery disease, advanced renal damage, and cerebral vascular accidents. Side effects are the same as those encountered with the three drugs separately; however, since the combination permits adequate blood pressure control with lower dosages than in single-drug therapy, side effects are minimal.

Indications • Ser-Ap-Es is indicated for the treatment of moderate to severe grades of hypertension. It is especially useful in those cases complicated by anxiety, impaired renal circulation, and/or edema.

Contraindications • Ser-Ap-Es should be used with caution in patients with coronary artery disease, advanced renal damage, and cerebral vascular accidents. If surgical treatment of hypertensive patients becomes necessary, the drug should be withdrawn 2 weeks before the operation, if possible. If an emergency operation is required, vagal blocking agents should be given parenterally to prevent or reverse hypotension and/or bradycardia that might be caused by the Serpasil in the drug.

Dosage schedule • To initiate therapy, 1 Ser-Ap-Es tablet 3 times daily is recommended. The dosage range is 1 or 2 tablets 3 times daily. The maximal reduction in blood pressure may not occur for 2 weeks; at this time the dosage should be adjusted to the amount necessary to obtain the desired blood pressure response. For maintenance therapy the lowest possible dosage should be employed. The need for salt restriction is reduced with the combination of Ser-Ap-Es. Prolonged daily administration of diuretics such as Esidrix may produce undesirable electrolyte changes. Careful observation and prompt institution of preventive or remedial measures, such as supplemental potassium or chloride, may be indicated.

How supplied • Ser-Ap-Es Tablets (pink), each containing 0.1 mg. Serpasil, 25 mg. Apresoline hydrochloride, and 15 mg. Esidrix; bottles of 100.

Manufacturer • Ciba, Summit, New Jersey.

References • Extensive clinical and pharmacological bibliographies on Serpasil, Apresoline, and Esidrix are available on request.

MODILAC

Chemistry • Modilac is a double homogenized combination of skim milk, dextrins-maltose-dextrose, and corn oil. It is supplemented with vitamins A, D, C, B_6, and thiamine.

Pharmacodynamics • The zero-curd tension of Modilac assures digestibility comparable with that of human milk. The new method of sterilization employed has the effect of preserving the natural milk color and flavor and insuring the bacteriologic safety of the product. Adapted to the infant's digestive and nutritional requirements, Modilac is designed as a sterile ready-to-use baby formula that assures adequate nutrition. In normal dilution (1:1), the formula provides 0.65 gm. protein, 0.83 gm. fat, and 2.47 gm. carbohydrate per fluid ounce. Its caloric distribution is protein 13 per cent, fat 37 per cent, carbohydrate 50 per cent. In addition to the vitamins listed above, the formula provides riboflavin, calcium, and phosphorus; the calcium/phosphorus ratio is 1:32.

How used • The standard feeding formula is based on the use of about 2.5 fluid ounces of the normal dilution of Modilac per pound of body weight per day. This would supply 3.6 gm. protein and 110 calories per kilogram (2.2 lb.) of body weight. When a lesser intake of protein is indicated, Modilac may be fed in a more dilute form.

How supplied • In cans, 13 fluid-ounce, 24 cans to a case.

Manufacturer • Gerber Products Company, Oakland, California.

CURRENT LITERATURE

Vascular collapse complicating septic abortion

▶ Six cases of abortion with septicemic shock are described by Leon L. Adcock, M.D., and Erick Y. Hakanson, M.D., in the *American Journal of Obstetrics and Gynecology*, March 1960. Although abortion complicated by sepsis does not ordinarily carry grave risk, the mortality rate may approach 50 per cent when the infecting organisms are exceptionally virulent or when they are introduced in gross numbers as in criminal abortion. To investigate the adequacy of present-day treatment, the authors have reviewed current concepts of the pathologic physiology involved, the physiologic basis for treatment, and the management of septic abortion, as well as detailing their suggested plan of treatment.

The appearance of vascular collapse without significant blood loss in a patient with septic abortion establishes the diagnosis; all the signs and symptoms of shock are present, with evidence of overwhelming infection and toxemia. Renal, hepatic, and cardiac complications should be anticipated. Prompt and vigorous therapy is mandatory if the patients are to survive long enough to allow an attempt at treatment of the infection. The blood pressure must be supported during the delay in institution of definitive therapy by a stat intravenous injection of a vasopressor agent. Metaraminol can be administered safely by any parenteral means. Vagotonic effects can be abolished by atropine. The blood pressure should not be elevated to normotensive levels, but to a level sufficient for urinary secretion of 30 to 50 ml. per hour. Blood and uterine cultures with sensitivity tests should be obtained before the institution of antibiotic therapy. A combination of antibiotics effective against staphylococci and gram-negative bacilli should be administered; all medications must be given intravenously. Hydrocortisone and Pitocin may be started in another intravenous infusion; Pitocin may be effective in completing an abortion, and it usually helps to control bleeding. In patients in whom abortion is not complete, the uterine contents should be evacuated within 12 hours. Patients with a history of criminal abortion and a prolonged febrile course with vascular collapse should probably be subjected to culdocentesis to determine whether there is pus in the peritoneal cavity; radical surgical treatment and the establishment of peritoneal-vaginal drainage might be lifesaving in some cases. Medical consultation regarding possible cardiac and renal complications should be obtained, and attention given to fluid and electrolyte balance, oxygen administration, and other supportive measures. Antibiotic therapy should continue for 3 weeks, and close follow-up is essential. As a corollary, patients with known or suspected criminally induced abortion should be observed carefully for early evidence of vascular collapse.

Effect of repeated fluoroscopic examinations on 1480 children with a long-term follow-up study

▶ Results of an attempt to determine the effects of ionizing radiation in serial fluoroscopies over a long period are reported by Ann McA. Birch, M.D., and David H. Baker, M.D., in *The New England Journal of Medicine*, May 19, 1960. Possible dangers in diagnostic radiology have been much discussed in recent years; the risk of genetic damage and leukemia and the exact doses likely to have deleterious effects have been matters for dispute. For this study the authors chose the records of patients attending the Rheumatic Cardiac Clinic at the New York Hospital, because this group comprised a large number of patients who, and their families as well, were followed for many years. The records of 1,480 patients, 746 female and 734 male, were studied with reference to the incidence of all types of neoplastic disease and to the congenital abnormalities in the patients' progeny. The selection of cases was based on the following criteria: All patients had had at least three fluoroscopic exposures; all were followed for at least 3 years after the year of their first exposure; and all were followed after 1932. The records began with 1916, and some of the cases had been followed for 37 years. In all cases, fluoroscopy was performed as part of the regular examination and of various special studies over the years. The whole thorax was examined in most cases, and the findings were frequently demonstrated to students, so that the patients as a group received a heavy exposure. The number of fluoroscopic examinations for each patient varied from 3 to 128. Only 1 patient received more than 100, and 37 received more than 50. The mean number of fluoroscopies was 18 for a female patient and 17 for a male patient.

Follow-up studies showed that two malignant tumors occurred among the 746 female patients, and

none among the 734 male patients. No case of leukemia has occurred in any of these patients or their progeny, although at least 1 case might have been expected theoretically. Among the 1,087 infants born to the original patients, 25 were stillborn; 9 of such deaths were from obstetric causes, 5 from congenital anomalies, and in the remainder the cause was unknown. The stillbirth rate was not significantly different from that for the general population, either in the whole group of 1,087 or in the 121 pregnancies during which fluoroscopy was performed. The rate of congenital anomalies was similar to that reported for the general population. The authors emphasize that the absence of deleterious effects in a group of this size should not be construed to mean that fluoroscopy entails no risk.

Psychosis and systemic lupus erythematosus

► Case reports from the past 60 years' literature concerning psychiatric dysfunction in systemic lupus erythematosus (SLE) are reviewed by W. Jeffrey Fessel, M.R.C.P., and George F. Solomon, M.D., in *California Medicine,* April 1960. Involvement of the central nervous system by SLE is more frequent than is commonly recognized. Moreover, psychosis may be the major manifestation of lupus and may antedate its other features by many years. Because of these findings, the authors announce that they have undertaken a long-term study in a large mental hospital, to determine how many patients have mental illness as an isolated sign of SLE. The hospital population will be screened for the presence of lupus factor in the serum by means of the nucleoprotein latex test.

In reviewing the literature, the authors found 227 cases of associated psychosis and SLE. The average incidence of psychosis in reported series of SLE cases was 22 per cent; the highest reported incidence was 52 per cent and the lowest 9 per cent, in similar series. The two major difficulties in evaluating the reports were: (1) The diagnosis of SLE was doubtful in cases reported before the description of the LE cell phenomenon in 1948; and (2) Psychiatric criteria varied considerably from one report to another. The effects of steroid therapy, however, were well defined, and it appeared that steroid compounds could be considered a possible cause of psychosis in only a minority of the cases in which such therapy was used. Furthermore, many reports of psychosis associated with SLE antedate the availability of steroids. There is some evidence that in cases where the psychosis is due to lupus, steroid therapy has a beneficial effect on the mental disorder.

The psychiatric manifestations reported were variable and were sometimes associated with a neurologic disorder such as epilepsy. In one case, the patient had had paranoid schizophrenia for 8 years; in 6 cases the psychosis was separated by only a few weeks from the appearance of SLE. Three patients had had epilepsy for 11, 14, and 16 years, respectively, before definite symptoms of SLE. In several cases, positive reaction to serologic tests for syphilis had been noted for some years before the appearance of SLE. It is suggested that SLE diagnostic studies be carried out in psychotic patients who have an accelerated sedimentation rate or positive serologic test for syphilis without apparent reason.

A study of etiologic factors in so-called primary pulmonary hypertension

► A suggestion that primary pulmonary hypertension may be closely related to the collagen diseases is contained in a report by Arnold J. Rawson, M.D., and Harry M. Woske, M.D., in the *A.M.A. Archives of Internal Medicine,* February 1960. The authors' review of well-documented published cases showed a higher than normal incidence of arthritis (8 per cent), Raynaud's phenomena (21 per cent), and lesions suggestive of collagen disease (10 per cent) in patients with primary pulmonary hypertension. The authors describe in detail four cases which they studied both clinically and at autopsy. The histologic appearance of the lungs was similar in all cases, consisting essentially of marked intimal cellular proliferation in the small muscular arteries and arterioles, with severe vascular stenosis. Two patients had arthritis and Raynaud's phenomena; one had extrapulmonary lesions suggestive of a collagen disease. In two cases there were close relatives having arthritis and Raynaud's phenomena. There is a question as to whether those cases exhibiting nonpulmonary manifestations in addition to pulmonary hypertension represent the same disease entity as those involving pulmonary hypertension alone. Evidence favoring the single-disease concept includes the similar histologic appearance of the small pulmonary arteries in the two conditions, similar age and sex distribution, and similar clinical course. A close relation between the pulmonary arterial disease and the nonpulmonary manifestations is strongly indicated by the high degree of association of these relatively infrequent phenomena, as well as by the similarity between digital and pulmonary arterial changes. Although the symptoms of primary pulmonary hypertension resemble those of scleroderma and of disseminated lupus erythematosus the differences in types of lesions as well as other manifestations make differentiation relatively simple. And although an occasional case of primary pulmonary hypertension may show a positive test for rheumatoid factor, the joint lesions do not appear typical of rheumatoid arthritis. The manifestations of collagen disease, however, are strongly suggestive.

Postoperative endocarditis due to Pseudomonas aeruginosa

► When intensive medical treatment fails to cure bacterial endocarditis a surgical approach might be indicated, according to a report by Maurice Teitel, M.D., and Alfred L. Florman, M.D., in *The Journal of the American Medical Association,* January 23, 1960. The authors report a case of postoperative

infection due to Pseudomonas aeruginosa, in which blood cultures continued to be positive until a suture covered with an infected vegetation was surgically removed from the atrial wall.

The patient was a 14-year-old girl who had undergone surgical repair of congenital cardiac anomalies, including a large interatrial septal defect. Her postoperative course was uneventful, and she was asymptomatic for 20 weeks after the operation. She then began to have a recurrent fever and occasional pain over the lower part of the thorax. Penicillin and tetracycline were ineffective, and the patient entered the hospital after 10 days. The diagnosis of endocarditis was made; it was suspected that the focus of infection lay in the operative site, and intensive antibiotic therapy was started. The organism was at first sensitive to polymyxin B, streptomycin, and neomycin, but became resistant to the latter two agents in a very short time. Polymyxin B given in large doses for more than 100 days failed, however, to eradicate the infection, although the combination of this drug with sulfadiazine seemed for a time to suppress it. The intravenous administration of polymyxin B offered no advantage over the intramuscular route and was more toxic. Despite the long administration of polymyxin B in doses of 4 mg. per kilogram of body weight, there was no permanent kidney damage. After 5 months the patient was reoperated on and a silk suture was found dangling in the right atrium, surrounded by a vegetation containing a pure culture of Pseudomonas. This was removed, as well as a portion of abscessed lung tissue, and the patient's convalescence was uneventful. With the recent advances in surgical technic for working on the heart, the risks attendant on this approach to an infective focus are diminishing, and the procedure may be lifesaving, as in the case reported.

Use of some progestational 19-nor steroids in gynecology

▶ An evaluation of the three most useful progestational steroids in various gynecologic disorders is reported by John Rock, M.D., Celso-Ramón García, M.D., and Gregory Pincus, Sc.D., in the *American Journal of Obstetrics and Gynecology*, April 1960. The authors' experience with Norlutin, Enovid, and Nilevar dates from 1955 and involves the treatment of more than 1,500 women, 1,000 of these in Puerto Rico and Haiti, and most of the remainder at the Reproductive Study Center and the Fertility and Endocrine Clinic of the Free Hospital for Women, Brookline, Massachusetts. The authors conclude that in Enovid and Norlutin the gynecologists have progestational agents which, when properly used, are harmless yet remarkably efficacious in relief of many disturbances of menstruation and reproduction.

A comparison of the chemical structures of the three synthetic steroids with those of the naturally occurring hormones progesterone and testosterone shows that the synthetics lack a 19-carbon atom at station 10—hence the term 19-nor steroids. Chemically, the generic terms for the three 19-nor steroids are as follows: Nilevar, norethandrolone, Enovid, norethynodrel; Norlutin, norethindrone.

The physiologic effects of the three steroids are similar. All exert a prompt and strong progestational effect on the human endometrium when taken orally each day. When appropriate dosage of any one of the three is begun before inception of ovulation, this process is inhibited through a critical depression of the pituitary production of gonadotropin. The amount necessary to produce anovulation and amenorrhea is somewhat higher with Nilevar than with the others, however. With Enovid, these effects can be achieved by only 10 mg. daily, and it is presumed that this higher potency is partly due to the purposeful inclusion of small amounts of a mildly effective estrogen. Enovid controls bleeding, somewhat better than the other two compounds, but seems to have a slightly greater tendency, initially, to cause mild nausea. The striking advantage of these gestagens over the estrogens is that on withdrawal of the former compounds, bleeding that closely resembles normal menstruation almost always occurs within 1 to 4 days.

All three compounds are associated to some degree with side effects such as nausea, mastalgia, abdominal pains, and edema. The incidence of these effects is somewhat higher with Enovid than with the others; on the other hand, Enovid has not resulted in the minor liver damage that has been noted with Nilevar and Norlutin. The indications are that untoward reactions occur, if at all, during the first cycle of treatment, the incidence declining to inconsequence by the fourth cycle.

The evidence in this study indicates that the effectiveness of these gestagens in control of nonpathologic endometrial bleeding is not as great as has been supposed. The control achieved by Enovid, by gradually increasing the dosage, is better than that possible with Norlutin or Nilevar. In cases of dysmenorrhea and hypermenorrhea both Norlutin and Enovid resulted in improvement, particularly when treatment was instituted before ovulation. In cases of infertility due to "inadequate luteal phase," there was some evidence that Norlutin and Enovid were beneficial, and further investigation of the possible efficacy of these hormonal supplements seems in order. The therapeutic effect of gestagens in cases of anovulatory dysfunctional flow was "very gratifying." But by far the most dramatic effect of Enovid or Norlutin in proper regimen, in the opinion of these authors, is the inescapable result of their unfailing suppression of ovulation. The contraceptive efficacy of Enovid and probably of Norlutin has been expressed as a 98.9 per cent reduction in fertility. With regard to possible ovarian damage, comparative studies of primordial follicles failed to reveal any destructive effect, and the occurrence of pregnancies during the 6 months following withdrawal of Enovid medication seemed to confirm the safety of the compound.

The above report was discussed by Drs. Robert A. Ross and Edmund W. Overstreet, who added case notes confirming the effectiveness of Enovid in

dysmenorrhea and abnormal bleeding, commented on the need for vigorous warning regarding careful search for possibly grave uterine pathologic conditions, and emphasized the importance of the findings related to the use of these gestagens as contraceptive agents, in view of widespread concern over "the population explosion."

Mobilization of the stapes in older patients with otosclerosis

▶ Improved surgical technics have made it possible to operate on many otosclerotic patients previously considered unsuitable for fenestration surgery, according to a report by Joseph Sataloff, M.D., and Hyman Menduke, Ph.D., in the *Journal of The American Geriatrics Society,* April 1960. Formerly the operation was considered inadvisable for patients showing very mild hearing losses, those with long-standing and marked hearing losses associated with significant deafness, and older patients who would not choose to risk the disturbing postoperative course that might ensue. On the basis of the authors' experience, however, it would appear that a diagnosis of fixation of the stapes usually justifies an attempt at mobilization.

Surgical mobilization of the stapes was attempted in 100 cases in which the age of the patients ranged from 50 to 73 years; a total of 138 ears were involved. In every case there was a long history of deafness due to otosclerosis. Results of preoperative air-conduction, bone-conduction, and air-bone gap studies varied widely in terms of hearing loss. A 15-decibel improvement in the hearing range was arbitrarily selected as indicating successful mobilization. On this basis, hearing improved in 54 per cent of the ears after the first operation, and additional improvement was achieved in 67 per cent of the ears operated on in a second revisionary procedure. Thus the estimated improvement rate in patients over 50 years old was 85 per cent. There was no correlation between the results of stapes mobilization and the age of the patient, the preoperative degree of hearing loss as indicated by the air-conduction threshold, superimposed perceptive deafness, or the difference between air-conduction and bone-conduction thresholds. For this reason it would be difficult to establish criteria for selecting patients as suitable for the mobilization operation. In several cases in this series in which the ears were seemingly "dead," the operative results were good enough to permit the effective use of hearing aids.

Antimicrobial-steroid treatment of active pulmonary tuberculosis as a routine measure

▶ Combined steroid and antimicrobial therapy is at present the best treatment in all cases of active pulmonary tuberculosis, according to a report by Henriette Marcus, M.D., and Panayotis Christopoulos, M.D., in the *A.M.A. Archives of Internal Medicine,* April 1960. The authors report on a series of 30 cases involving various forms of tuberculosis, and describe 5 of these cases in detail. In an Addendum the authors state that the present total number of patients treated by their method is 120, and that the results have been the same throughout the series.

The treatment was essentially the same for all forms of tuberculosis, and included isoniazid, streptomycin, and aminosalicylic acid. In a few cases cycloserine was used instead of streptomycin. Isoniazid dosage was between 200 and 450 mg. daily; streptomycin dosage varied between 1 gram daily (for the first month) and 1 gram two or three times a week. The aminosalicylic acid was given in doses up to 12 grams daily; if not tolerated it was omitted. The steroid used was either prednisone or prednisolone. The dosage was most easily determined in acute febrile cases, since the temperature response was an important guide. In the average case, the temperature was reduced to normal by a dosage of 40 mg. of prednisone daily; in patients who had received steroid therapy previously, doses up to 60 mg. were sometimes necessary. The amount was cautiously reduced every 5 to 7 days, to a maintenance level of 12 to 20 mg. daily without temperature elevation. Maintenance level was usually reached within 4 weeks. Progress was checked by x-ray films, which showed a rapidity of improvement so predictable that it could no longer be considered remarkable. All patients showed immediate symptomatic improvement, and none showed clinical or roentgenographic deterioration on this treatment. After 2 to 4 weeks, only 6 patients showed less than moderate improvement. At the end of 3 months all but 2 patients showed either moderate, marked, or very marked clearing of the lungs. This group was compared to a group of 30 patients treated identically except for omission of steroid hormone, and the comparison demonstrated the advantages of the combination form of treatment. Complications were few and mild.

Roentgen studies in hyperparathyroidism

▶ A group of three articles in *The American Journal of Roentgenology, Radium Therapy, and Nuclear Medicine,* April 1960, constitutes a substantial review of basic information, roentgen technics, and case reports concerning aspects of bone disease associated with primary and secondary hyperparathyroidism.

1. The article entitled "Primary Hyperparathyroidism," by Ching Tseng Teng, M.D., and M. Herbert Nathan, M.D., emphasizes the importance of early detection of osseous changes so that correct management may minimize morbidity and incapacitation. Radiologists, as well as internists, orthopedists, urologists, and dentists, have the opportunity and the responsibility of making the diagnosis of primary hyperparathyroidism at an early stage. The possibility should be kept in mind until the diag-

nosis is confirmed or excluded by other studies. The primary disease may be due to adenoma, diffuse hypertrophy and hyperplasia, or rarely carcinoma, of the parathyroid glands. The secondary type may be associated with advanced renal disease and with severe osteomalacia.

The authors review published reports on primary hyperparathyroidism and describe their own series of 7 cases. All 7 patients proved to have parathyroid adenoma at operation. Four had extensive bone disease; one had a renal stone and early bone changes; another had recurrent renal stones and suspected bony abnormalities; and one had no demonstrable bone or kidney disease. Included is a patient whose roentgenograms demonstrated renal calcinosis and healed cystic lesions in the ilium and pubis 10 years after parathyroidectomy. Roentgenographic details are given for 4 cases showing advanced bone changes, 1 with less advanced changes, and 1 showing the very early changes. The healing of osseous lesions after surgical treatment is demonstrated by comparison of pre- and postoperative roentgenograms. A study of roentgen films in advanced cases can help the radiologist establish criteria for the detection of minimal abnormalities in early stages of the disease. The authors discuss the major aspects of the clinical syndrome, the pathophysiologic and chemical changes, and the roentgen changes, which should be understood by physicians called upon to treat primary hyperparathyroidism.

2. "The Skull in Hyperparathyroid Bone Disease" is discussed by Kent Ellis, M.D., and Robert J. Hochstim, M.D., who shed further light on an aspect touched upon in the first article. The authors review and classify the roentgenographic findings in the calvarium in 39 cases of primary hyperparathyroidism involving bone lesions. In this disease the calvarium usually shows characteristic homogeneous ground-glass or mottled granular patterns of decreased density. The differential diagnosis may be complicated by the presence of focal patches of bone resorption in the calvarium, and focal patches of bone sclerosis may be seen in a few cases of active disease. It is suggested that such changes are the consequence of partial or complete healing of previously active bone disease. In such cases it may be extremely difficult to differentiate between primary hyperparathyroidism and Paget's disease or osteoblastic metastases. In 26 of the 39 cases, the diagnosis of hyperparathyroid bone disease could have been suggested on the basis of the skull roentgenograms alone. In retrospect, nearly all cases showed some involvement of the calvarium. Roentgenograms of the skull were often of positive value in making the correct diagnosis.

3. The problem of osseous changes is further clarified by the article on "Advanced Skeletal Changes in Hyperparathyroidism," by Richard M. Friedenberg, M.D., and Victor Sayegh, M.D. The cases of hyperparathyroidism which demonstrate skeletal changes usually show one or more of the following signs: diffuse osteoporosis usually associated with a granular mottling of the skull and to a lesser extent of the long bones; subperiosteal bone resorption most often seen in the fingers, clavicles, and medial aspects of the tibia; cystic changes in the bone which are in reality solid tumors of low density composed of osteoblasts and osteoclasts and are the end results of increased metaplasia of bone; and periarticular calcifications often localized in areas of trauma and associated with pathologic fractures. The authors present reports, illustrated with roentgen films, of 3 cases which demonstrated to an advanced degree all of these skeletal changes. All 3 patients were young women; when first seen they were aged 33, 25, and 20, respectively. The first died of uremia with terminal bronchopneumonia; autopsy revealed bilateral contracted kidneys and hyperplastic parathyroids, but a true adenoma was not found. This case in its later stages had been marked by extreme periosteal resorption of bone. The second case, which at first was treated as thyroiditis, resulted in the patient's death 5 years later. Autopsy revealed a parathyroid adenoma, as well as diffuse calcification throughout the kidneys and many other organs and joints, and marked decalcification in all of the long bones and skull. In the third case, a parathyroid adenoma was removed surgically; roentgenograms showed typical bone changes and several pathologic fractures. The authors present these cases to re-emphasize the characteristic changes that may be seen in this disease, even though early medical diagnosis has reduced the frequency of their occurrence.

Masculinization of female fetus due to use of orally given progestins

▶ The danger of administering oral synthetic progestins to mothers in the treatment of habitual or threatened abortion is pointed out by Lawson Wilkins, M.D., in *The Journal of the American Medical Association*, March 5, 1960. If progestational steroids or estrogenic compounds are valuable and necessary in the prevention of abortion, the ones that are least likely to cause fetal masculinization should be used. In recent years Norlutin (17-alpha-ethinyl-19-nortestosterone) has caused masculinization of female fetuses often enough to preclude its use or advertisement as a safe hormone to be taken during pregnancy. Although the older compound 17-alpha-ethinyltestosterone has caused masculinization comparatively infrequently, it should also be considered potentially hazardous to the fetus. This compound has been used for about 15 years, as Progestoral, Pranone, or Lutocylol.

The author bases his conclusions on his analysis of 70 cases of fetal masculinization of female infants associated with the oral administration of progestins to their mothers. In 25 cases the mothers were given estrogens with the progestins in order to offset the virilizing effect of the progestin, but the evidence showed that the estrogens did not prevent fetal masculinization. The data do not argue against the use of progesterone, since this is the natural hormone of pregnancy and could hardly be implicated in masculinization except in the rare case of abnormal metabolism of progesterone.

Visual problems of roentgen interpretation

► Efforts to increase the accuracy of roentgen interpretation by added technics may have reached the point of diminishing returns, in the opinion of William J. Tuddenham, M.D., as reported in the *New York State Journal of Medicine*, April 15, 1960. Little is to be gained through continually increasing radiographic definition and contrast as long as the degree of detail now possible is not utilized effectively. The accuracy of roentgen diagnosis can be increased only if the limiting factors are identified and controlled. The perception of an image depends on the pattern of illumination projected on the retina of the observer, and bears no constant relationship to either radiographic contrast or definition. Although past developments have certainly improved radiography and facilitated accurate roentgen diagnosis, current evidence indicates that before further improvement in methods can be expected other problems must be solved.

The author discusses evidence pertaining to the importance of definition, contrast, and distortion, pointing out that most avoidable diagnostic errors result from failure to perceive gross abnormalities in the roentgenogram, regardless of microfocal spot tube, ultrafine grain film, or millisecond timing device. Most significant images are gross, and with competent technic they are recorded adequately by existing roentgen methods. The most pressing need in diagnostic radiology at present is better understanding and control of psychologic factors affecting one's ability to perceive recorded images. In organizing figural elements into meaningful patterns the radiologist is guided by experience and expectations. Shadows may be interpolated which are not actually perceived, and perceived images may be falsified in order to create a meaningful pattern, thus leading to serious errors in roentgen diagnosis. Also, error occurs when in the initial organization of the shadows of a roentgenogram, significant shadows are lost in the "ground."

The author concludes that most diagnostic errors today result not from the failure to record critical shadows but rather from the failure to organize the visual field effectively. Further study of film-scanning systems, selective radiographic technics, and environmental factors may help to solve this problem and thus contribute to greater accuracy of roentgen diagnosis.

Postpartum hypertension after use of vasoconstrictor and oxytocic drugs

► The etiology, incidence, complications, and treatment of drug-induced hypertension in the postpartum period are discussed by Gilbert N. Casady, M.D., Daniel C. Moore, M.D., and L. Donald Bridenbaugh, M.D., in *The Journal of the American Medical Association*, March 5, 1960. Too few physicians, say the authors, are aware that a severe, persistent, dangerous hypertension, and even rupture of a cerebral blood vessel which may cause brain damage and hemiplegia, can result from the combined effect of a vasoconstrictor and an oxytocic drug administered to a patient within 3 to 6 hours of one another. In reviewing the records of 741 patients who were given a vasoconstrictor at initiation of caudal block analgesia and an oxytocic drug at the time of placental delivery, the authors found that severe hyptertension resulted in 34 (4.6 per cent) of the patients, with cerebrovascular injury in 1. It is believed that in many more cases there was postpartum hypertension unrecognized in the form of a severe headache. Treatment with chlorpromazine hydrochloride to prevent the severe and disabling complications of postpartum hypertension is essential. The authors suggest that the need for prophylactic administration of vasoconstrictor drugs in conjunction with caudal block analgesia in obstetrics is doubtful, in view of their findings. They also point out that the syndrome can develop in other types of patients who might be given these drugs in this sequence for any reason.

The management and repair of lesions of the ureter with fistula

► The need for immediate attention to the ureteral fistula that may result from trauma during pelvic surgery is stressed in an article by Sidney R. Weinberg, M.D., Frank C. Hamm, M.D., and Benjamin Berman, M.D., in *Surgery, Gynecology & Obstetrics*, May 1960. The lesion may be ureterovaginal or ureterocutaneous, and is apt to occur especially in connection with radical hysterectomy or abdominoperineal resection of the rectum. Prompt treatment is important for two reasons: Constriction of the ureter at the site of fistula may develop, causing proximal ureteral dilation with hydronephrosis, and threatening atrophy of the kidney with complete irreparable loss of function. Also, external urinary drainage must be relieved.

When a single ureter is involved, the rate of development of fistula and the appearance of external urinary drainage varies with each patient, and the early signs and symptoms may be overlooked or mistaken for disturbances resulting from the extensive surgical procedure. When both ureters are involved, clinical recognition is prompt because oliguria and anuria result, followed by all the symptoms and signs of rapid loss of kidney function. This is an urgent situation requiring immediate cystoscopy with an attempt to drain the kidneys by ureteral catheters; if this is not successful, nephrostomy, deligation of ureters, or a combination of these procedures must be carried out. Once the diagnosis is suspected, excretory urography and then cystoscopy with an attempt at retrograde delineation of the ureters should be performed. If ureteral obstruction is incomplete, successful healing of the ureter without stricture may result, but when complete obstruction is encountered, hydronephrosis will result if corrective surgery is not carried out. Surgical correction of ureteral fistula has in the past consisted of: (1) nephrectomy; (2) tying the

ureter in the hope that the involved kidney would cease functioning; or (3) reconstructive surgery to eliminate the fistula and re-establish continuity of ureter with the bladder. Nephrectomy is indicated only for incurable disease or permanent serious damage to the kidney; tying the ureter can lead to serious trouble and is not recommended. Reconstructive surgery by means of ureteronecystostomy is the treatment of choice. The authors report good results with this method in 6 cases. The procedure was modified by elimination of splints, and by diversion ureterotomy where necessary.

Early diagnosis of congenital dysplasia and congenital dislocation of the hip

▶ The value of the thigh abduction test in the routine physical examination of infants is emphasized in a report by Lloyd E. Harris, M.D., Paul R. Lipscomb, M.D., and John R. Hodgson, M.D., in *The Journal of the American Medical Association*, May 21, 1960. There has long been general agreement that early diagnosis and treatment are essential to optimum results in congenital disease of the hip. The authors report that the use of the abduction test, with roentgenographic studies of those infants showing a positive response to the test, has enabled them to reduce materially the age at which the diagnosis can be made. Moreover, the test is easily applied and requires minimal experience for adequate interpretation.

The test was used as a screening procedure in 11,010 newborn infants, about 90 per cent of whom were subsequently examined regularly in well-child clinics. With the test, the average age at diagnosis of congenital dysplasia with dislocation was reduced from 14 to 4 months, and no dislocations were undiscovered before the weight-bearing age. In most infants full 90-degree abduction is unusual after the neonatal period; during the second through the eighth or ninth month abduction is frequently in the range of 60 to 70 degrees. With dysplasia and dislocation, abduction is usually limited to 45 to 50 degrees. Abduction limited to 60 degrees or less warrants roentgenographic examination. A negative result of the abduction test at birth does not rule out potential dislocation of the hip, and the test should be done regularly during the first 12 months of life. Since most infants do not receive regular examinations during the first year, it is suggested that an effort to educate mothers in the application of the abduction test would be justifiable. The problem of diagnosis is the responsibility of all physicians dealing with children, while the problem of treatment should be in the hands of the orthopedic surgeon.

BOOK REVIEWS

▶ *Books for review which were received during the period from May 5 to June 5 are listed on advertising pages A-150 to A-151. Reviews of these books will be published as space permits.*

▶ LES MANIPULATIONS VERTÉBRALES. By Robert Maigne. Cloth. Pp. 246, with illustrations. Expansion Scientifique Francaise, 15, rue St-Benoit, Paris, 1960.

It is a rare privilege for a teacher to review the work of his student. Dr. Robert Maigne is a graduate of the London College of Osteopathy. He has written this book, in French, to introduce manipulation to his fellow medical doctors in France.

Manipulation as practiced by the osteopathic profession is relatively unknown on the continent of Europe. However, increasing interest has been shown in this subject in the past decade. Dr. Maigne has attempted to describe the art of joint manipulation in rational scientific terms. In this attempt he has succeeded very well; *Les Manipulations Vertébrales* gives a definitive treatment of the subject.

The book begins with a brief history of the various schools of joint manipulation and their founders, followed by the history of the development of osteopathy in France.

The principles of the art of joint manipulation are presented in a lucid manner, including a discussion of the different methods of effecting movement at the vertebral joints, the diagnosis of the disturbed mechanics, the conduct of the treatment, the indications and contraindications for the use of manipulation, and the mode of action of manipulation.

The second part of the book contains a description of manipulative technics arranged according to area of the spine. The technics are illustrated by photographs of excellent quality and with arrows drawn in to show the direction of movement. In many cases a line drawing has been added to lend further clarity. The illustrations alone are enough to recommend the book to the English-speaking reader.

The third part of the book describes the application of manipulative technics to specific clinical entities, such as headache, syndrome of Barre-Lieou, and cervical-brachial neuralgias.

The book is completed by a chapter by Dr. Roger Lescure on the effect of manipulation on the treatment of organic disease, and a chapter by Dr. Rene Waghemacker on exercise to complement the effect of manipulation in the rehabilitation of the patient.

The book will be of primary value to the doctor who can read French. However, it will be of inter-

est to all osteopathic physicians because of the excellent illustrations which can be readily understood by all. *Les Manipulations Vertébrales* is the best treatment of this subject that has been published by a member of the osteopathic profession in several decades.

MYRON C. BEAL, D.O.

▶ DISCOVERING OURSELVES. A view of the human mind and how it works. By Edward A. Strecker, M.D., Sc.D.; and Kenneth E. Appel, M.D., Sc.D.; in collaboration with John W. Appel, M.D. The Department of Psychiatry, University of Pennsylvania. Cloth. Pp. 303, with illustrations. Price $4.75. The Macmillan Company, 60 Fifth Avenue, New York 11, 1958.

"*Discovering Ourselves* is an elementary book or primer on the psychology of motivation, behavior, and human relations"—a book which continues to sell 29 years after the first edition was printed. It is a guided course in reading, not rigid, dogmatic, or complicated.

Problems, psychological mechanisms, and the dynamics of personality are discussed . . . . it points out some "causal" relationships or factors in ineffectiveness, discontent, unhappiness, discouragement, depression, and many important psychosomatic illnesses. It offers questions that we should ask ourselves when we are not getting along well or finding satisfaction, either physically or mentally. . . . It should help patients who are not too sick, but of course it is not a substitute for doctors, psychiatrists, or the clergy.

The book is a distillation of years of psychiatric practice, of helping with adolescent, parental, vocational, marital, medical, mental, and religious difficulties, and of teaching psychiatry in medical schools. The underlying philosophy is "not that we should have less science" in coping with these difficulties but that with "new visions, understanding, and rededications, science . . . can help people live more fully and abundantly," instead of contributing to their destruction.

The scope of the book may be realized by a description of its several areas. The four parts acquaint the reader with (1) Concepts of Modern Psychology, (2) Psychology of Everyday Life: The Conflicting Urges of Thought, Feeling and Action, (3) The Nature of Emotion, Anger and Fear, and (4) Mental Mechanisms Which the Personality Utilizes to Meet Conflicting Urges and Difficulties in Everyday Life. Throughout, the authors describe in lay vocabulary the more specialized concepts. The appendices make this book unusually useful. There are questions on chapter content which can be utilized by the reader, group leader, or medical student; questions for the individual to answer about himself, resulting in a personality study; and questions related to specific topics such as physical equipment, feelings and instincts, conscience, ideals, goals, ego, and will.

The makeup of the book enhances its appeal and clarity. Descriptive material accompanies the headings in the Table of Contents and also introduces each chapter. The reader is directed to desired information by topic and name in the index. Conveniently, chapter headings are carried at the top of each page. Numerous diagrams clarify significant psychologic concepts, and adequately spaced type makes for fluency in reading.

The authors clearly fulfill the purpose of the book. They have placed within the grasp of any earnest reader material which has proved its usefulness in the past, is revised to include current understandings, and is clothed in language of minimum semantic pitfalls. The book, therefore, should be within the reach of those who can use it. It could guide the medical student toward a better understanding of himself, aid the practicing physician in gaining insight, or be of help to the person in psychotherapy who is ready to read. It should be in the medical school library and might well serve as a beginning text in medical psychology.

FLEDA M. BRIGHAM, D.O.

▶ HISTOPLASMOSIS. Edited by Henry C. Sweany, M.D., Missouri State Sanatorium, Mount Vernon, Missouri. Cloth. Pp. 538, with illustrations. Price $14.50. Charles C Thomas, Publisher, 301-327 East Lawrence Avenue, Springfield, Illinois, 1960.

There are a large number of contributors to this book, each of whom has had a major part in the study of histoplasmosis. The book presents the historical aspects of the disease, the geographic distribution of the fungus, and the resistance of animals and man to the infection. Then all the diagnostic tests used in the care of patients suspected of having histoplasmosis are reviewed. All the clinical types are well described in this book. This is a specialty book and probably will find most use in institutions which deal with diseases of the chest.

GEORGE E. HIMES, D.O.

▶ PATIENT CARE AND SPECIAL PROCEDURES IN X-RAY TECHNOLOGY. By Carol Hocking Vennes, R.N., B.S., formerly Surgical Supervisor and Clinical Instructor, University of Minnesota Hospitals, Minneapolis, Minnesota; and John C. Watson, R.T., Director of Courses in X-Ray Technology, University of Minnesota Hospitals, Minneapolis, Minnesota. Cloth. Pp. 203, with illustrations. Price $5.75. The C. V. Mosby Company, 3207 Washington Boulevard, St. Louis, 1959.

This text is well written, having a great deal of detailed information which has been carefully prepared with every phase of radiography in mind. Some of its contents, however, would not be applicable to the average x-ray department. For example, it would be safe to say that the average technician would not be called upon to give hypodermic injections of such substances as Pitressin. The authors do point out that it may be allowed in isolated instances but should not be a routine. This reviewer does not believe that the technician should be given this responsibility under any circumstances, any more than he or she should be allowed to administer intravenous contrast media.

The most impressive section and that which should be stressed in all radiology departments is the technician-patient relationship. All too often the technician does not recognize the signs of a seriously ill patient, not because he is disinterested but because

he is purely ignorant of signs and symptoms. This is dealt with very well in this book in a section on bedside radiography. To obtain a film of good quality at the bedside is in itself a problem, but to know how to handle a critically ill patient, where extreme caution and gentleness must be exercised, is a special problem by itself.

This is an excellent piece of work, and it should be read and heeded by every x-ray technician.

EDWARD P. SMALL, D.O.

▶ DIFFERENTIAL TREATMENT AND PROGNOSIS IN SCHIZOPHRENIA. By Robert D. Wirt Ph.D., Associate Professor of Psychology, University of Minnesota; Consultant, Psychiatry Service Veterans Administration Hospital, Minneapolis, Minnesota; and Werner Simon, M.D., Chief, Psychiatry and Neurology Service, Veterans Administration Hospital, Minneapolis, Minnesota; Professor of Psychiatry, University of Minnesota. Cloth. Pp. 198, with illustrations. Price $6.50. Charles C Thomas, Publisher, 301-327 East Lawrence Avenue, Springfield, Illinois, 1959.

This book represents the results of 4 years of careful scientific research and evaluation of the drugs Chlorpromazine and Reserpine as compared with electroconvulsive therapy and insulin coma therapy. The conclusions are that Chlorpromazine is nearly as effective as the more expensive and complex traditional therapies, but that Reserpine appears no better than hospitalization alone. The most noteworthy feature of the book is the attempt to maintain strict scientific validity without the concessions the clinician usually must make to practical therapeutic needs.

Some confirmation of previously reported short-term prognostic indications in schizophrenia are that rapid onset with short duration is prognostically favorable as is good former occupational adjustment. Those patients with sufficient ego strength and affective admixture to act out in their environment do better than those who withdraw and conform. Hostile and rejecting fathers in early life render a patient least likely to recover. Those with mothers who were sources of protection and strength, even if inconsistent in their training methods, have better prognoses.

This book will be of interest to physicians and psychologists and others involved in psychopharmacology. Its greatest contribution is as a model for an ideal scientific experiment in man.

IRWIN ROTHMAN, V.M.D., D.O.

▶ PRINCIPLES AND PRACTICE OF OBSTETRIC ANAESTHESIA. By J. Selwyn Crawford, M.B., Ch.B., D.A. (England), F.F.A.R.C.S., Anaesthesia Service, The Presbyterian Hospital, New York; Late Senior Registrar and First Assistant, Department of Anaesthesia, Central Middlesex Hospital, London. Cloth. Pp. 128, with illustrations. Price $4.00. Charles C Thomas, Publisher, 301-327 East Lawrence Avenue, Springfield, Illinois, 1959.

This small volume will not be too popular with American anesthesiologists. The basic principles are acceptable, but I am certain that some of the practices presented will not be too acceptable. This is particularly true of the suggestion that thiopental sodium be used as an induction agent prior to preparing the surgical field for cesarean section.

A good suggestion, and one which your reviewer has utilized often since 1952, is the induction of anesthesia in a patient suspected of having a full stomach in the "head-up" tilt position, and then rapidly passing an orotracheal tube.

I can recommend this small book to residents in anesthesiology only for the purpose of comparative reading.

A. A. GOLDEN, D.O.

▶ THE MANAGEMENT OF ORAL DISEASE. A Treatise on the Recognition, Identification, and Treatment of Disease of the Oral Regions. By Joseph L. Bernier, D.D.S., M.S., F.D.S., R.C.S. (Eng.), Colonel, Dental Corps, United States Army; Chief, Oral Pathology Division, Armed Forces Institute of Pathology; Pathologist to the Registry of Oral Pathology of the American Dental Association; Professor of Oral Pathology, Georgetown University School of Dentistry; Chairman, Dental Research Advisory Committee to the Medical Research and Development Division, Department of the Army; Special Lecturer in Oral Pathology, Walter Reed Army Institute of Research; Special Lecturer in Oral Medicine, Jefferson Medical College; Consultant in Oral Pathology to the Veterans Administration, Central Office. Ed. 2. Cloth. Pp. 875, with illustrations. Price $15.00. The C. V. Mosby Company, 3207 Washington Boulevard, St. Louis 3, 1959.

Any article, story or book establishes itself with a reader by its incipient approach. The author of this book provides excellent orientation with three graphs. He further grasps a favorable correlation by his basic premises—without being condescending, as if writing for neophytes: "Seldom is disease announced by a single symptom." "To eliminate symptoms without having established the nature of the disease process which has produced them is never the correct approach in therapy." The reader shortly knows the author is not going to parrot or pirate others' opinions.

As one would suspect, a text by an oral surgeon does have considerable material specifically related to teeth, but only about 25 per cent of the book is exclusively of dental interest. Chapters on oral lesions in deficiency and metabolic diseases, oral lesions in diseases of the blood, and superficial keratoses and dermatologic-like lesions of the oral mucosa make this book of value to any practicing physician.

Of particular interest is the stress placed on histopathologic changes found in diseases of the mouth. The section on tumors is superb, beginning with oral congenital changes, to superficial keratoses, and on to benign and malignant tumors, including tumors of oral appendages and salivary glands. The relation of dermatology and oral lesions is the extension of pathology or, perhaps, the sharing of pathologic change; oral lesions often precede dermal manifestations, as in pemphigus.

Thorough coverage without redundant verbiage is enhanced by the author's presentation of his interpretation of facts without controversial therapies. It is a book recommended to all, but a "must" for the dermatologist, pathologist, and otolaryngologist.

A. P. ULBRICH, D.O.

▶ THE PRACTICAL EVALUATION OF SURGICAL HEART DISEASE. Written and Compiled by Robert G. Trout, M.D.; Edited by Robert P. Glover, M.D. Cloth. Pp. 132, with illustrations. Price $10.00. McGraw-Hill Book Company, 330 West 42nd Street, New York 36, 1959.

This is a book with some very good ideas which are rather poorly presented. On the "good" side of the ledger are such features as practicality, with the inclusion of only such features as would be of immediate use to the surgeon and omission of extraneous and controversial topics. On the "bad" side is the lack of competent editing of the text, which means that what should be lucid is buried in too many words and a jargon-loaded style. There are many well-chosen roentgenograms to illustrate the text, but these suffer from poor reproduction and printing. For such an important phase of the book it is surprising that one of the newer, better methods of reproduction was not used. It would have been helpful if these x-rays had been printed in sizes that would show more detail, and with a better printing method. Drawings are profuse, and although they appear amateurish in many instances, they tell a useful tale.

One item we have not encountered before is the inclusion of a 45 r.p.m. record of heart sounds, with examples of mitral stenosis and insufficiency, aortic stenosis and insufficiency, patent ductus arteriosus, pulmonary stenosis, and septal defects. This should prove novel as a teaching method, as well as providing a distinctive feature for the book.

The total impression is that the material is quite useful, and it is too bad that the mechanical details of editing and production were not managed in a more professional manner.

▶ DIAGNOSTIC RADIOISOTOPES. By Charles A. Owen, Jr., M.D., Ph.D. (Med.), Section of Clinical Pathology, Mayo Clinic; and Associate Professor of Clinical Pathology, Mayo Foundation Graduate School, University of Minnesota, Rochester, Minnesota. Cloth. Pp. 425, with illustrations. Price $15.75. Charles C Thomas, Publisher, 301-327 East Lawrence Avenue, Springfield, Illinois, 1959.

A subject which was discussed briefly in the June JOURNAL is most generously expanded for interested readers in this new book on the diagnostic use of radioisotopes. Unlike many books on the general subject, which emphasize basic radiophysics and radiochemistry, this work is designed for use in clinical diagnosis. The material is limited in coverage to diagnostic testing, rather than including therapeutic testing, partly because of a difference in detecting equipment for the two procedures but mainly because of a difference in basic concern. Instead of emphasizing the biologic effect of radiation, the diagnostician emphasizes precise measurement of radiation as an agent of quantitation, as is the case with any laboratory test.

The first main section of the book relates to this task of precise measurement and details many methods for accomplishing it. Other major sections discuss the use of radioisotopes in connection with metabolism, hematology, localization of tumors, diagnosis in the gastrointestinal tract and cardiovascular system, and some other general applications of radioisotopes. There is a section on radiation hazards and Federal regulations concerning radiation, and appendices with tables of physical decay, lists of radioactive isotopes, four-place logarithm tables, and a nomogram for determining body surface area.

Established tests are given the most space, and those that seem most promising the next priority, while newer and incompletely tested procedures are only mentioned briefly. The material has the added weight of Mayo Clinic testing. The tone of the book is both practical and authoritative.

▶ ENCYCLOPEDIA OF MEDICAL SYNDROMES. By Robert H. Durham, M.D., F.A.C.P., Physician-in-Charge, Division of General Medicine, Henry Ford Hospital, Detroit. Cloth. Pp. 628. Price $13.50. Paul B. Hoeber, 49 East 33rd Street, New York 16, 1960.

A dictionary can only define and describe in a brief statement the various components of a syndrome. Because of the many synonyms employed to designate similar conditions, and because some writers prefer eponyms while others prefer descriptive terms or their synonyms, it is difficult to find material on a specific subject even in standard indexes to medical literature. This book is designed to mark the halfway point between a dictionary and an encyclopedic review by supplying brief descriptions of the various syndromes, along with key references, and cross-indexing the synonymous terms.

The description of each condition averages less than a page in length, yet the author's intention was to include historical facts, comments upon hereditary, congenital, and familial factors as well as the usual incidence and sex ratios, detailed clinical manifestations, pertinent laboratory and pathologic findings, the etiology when known, differential diagnosis, the clinical course, prognosis, and known therapy and therapeutic results for each syndrome. The author has actually succeeded quite well with this prodigious assignment, and his work will doubtless prove useful to many classes of users.

This book will likely improve with each succeeding edition, not only by incorporating new therapeutic developments but by expanding and refining the present coverage. It has a unique place, and may well become a standard.

▶ A TEXTBOOK OF NEUROLOGY. By H. Houston Merritt, M.D.; Professor of Neurology, Columbia University; Director of the Service of Neurology, Neurological Institute, Presbyterian Hospital. Acting Vice President in Charge of Medical Affairs and Acting Dean of the Faculty of Medicine, Columbia University. Consultant Neurologist, Montefiore Hospital, New York. Ed. 2, Revised. Cloth. Pp. 765, with illustrations. Price $12.50. Lea & Febiger, Washington Square, Philadelphia 6, 1959.

The revised edition of this textbook is a competitor for the title "standard in its field." Discussions of newly described diseases have been added; the discussions of pathogenesis and therapy of a number of morbid entities have been lengthened; the descrip-

tions of diseases which have become less important have been condensed; and the reference list has been brought up-to-date. In addition, the material has been rearranged somewhat and the illustrative content has been enlarged. This book has more references to clinical reports and experience than is average in textbooks. The qualities which made its first edition acceptable 4 years ago will no doubt continue to make it usable in the future.

▶ METALS AND ENGINEERING IN BONE AND JOINT SURGERY. By Charles Orville Bechtol, M.D., Professor of Orthopedic Surgery and Chairman of Orthopedic Division, University of California, Los Angeles; Chairman of Subcommittee on Testing, Prosthetics Research Board, National Research Council; Albert Barnett Ferguson, Jr., M.D., Silver Professor of Orthopedic Surgery, and Chairman of Orthopedic Department, University of Pittsburgh; Children's and Presbyterian Hospital Pittsburgh; Consultant, Orthopedic Surgery, U.S. Veteran's Hospital, Oakland, Pittsburgh; St. Margaret's Hospital, Pittsburgh; Green County Hospital, Waynesburg; and Patrick Gowans Laing, M.B., B.S., F.R.C.S., Assistant Professor of Orthopedic Surgery, University of Pittsburgh; Chief of Orthopedic Service, U.S. Veteran's Hospital, Oakland, Pittsburgh. Cloth. Pp. 186, with illustrations. Price $8.00. The Williams & Wilkins Company, 428 East Preston Street, Baltimore 2, 1959.

An attempt at applying the fundamental principles of engineering to the problems encountered in the use of metallic fixation in orthopedic surgery is represented by this volume. A great portion of the book is devoted to evaluation of the use of metals, and it includes many illustrations of the various devices and materials which can be used as well as diagrams of their behavior in contact with living tissue. Other sections are devoted to a discussion of bone as a structure and to the replacement of living tissue. A final pair of chapters relates to fracture healing in a temporary splint and internal fixation with plates and screws. An engineering-orthopedic glossary concludes the book.

This book, so far as we know, is unique in its field and should concentrate much information for the orthopedic surgeon which has previously been available only in widely scattered sources.

▶ Ciba Foundation Symposium Jointly with The International Union of Biological Sciences on BIOCHEMISTRY OF HUMAN GENETICS. Editors for the Ciba Foundation: G. E. W. Wolstenholme, O.B.E., M.A., M.B., M.R.C.P.; and Cecilia M. O'Connor, B. Sc. Cloth. Pp. 347, with illustrations. Price $9.50. Little Brown and Company, 34 Beacon Street, Boston, 1960.

The first of the Ciba Symposia to be held outside of London was on the topic "Biochemistry of Human Genetics." A group of scientists who met in Naples produced this group of papers, which covers many aspects of the complex problem. These include genetical analysis in man; biochemical genetics as illustrated by hereditary galactosemia; cholinesterase types; genetical variation and sense perception; the genetics of primaquine sensitivity of the erythrocytes; chemical and genetical units of the hemoglobin molecule; the genetical control of protein structure, especially the abnormal human hemoglobins; studies of fetal myoglobin; genetics of the plasma protein variants; biochemical aspects of the inherited variations in human serum; including haptoglobins and transferrins; some immunochemical aspects of the products of the human blood group genes; some genetical aspects of the biosynthesis of human blood group substances; physiologic genetics of human blood factors; general considerations on immunogenetics; hereditary gamma globulin groups in man; tissue culture; and the mechanism of gene action. A general discussion closes the book.

▶ PHYSIOLOGY OF SPINAL ANESTHESIA. By Nicholas M. Greene, M.D., Professor of Anesthesiology and Lecturer in Pharmacology, Yale University School of Medicine; Director of Anesthesia, Grace-New Haven Community Hospital. Cloth. Pp. 208, with illustrations. Price $6.00. The Williams and Wilkins Company, 428 East Preston Street, Baltimore 2, 1958.

At a time when such an excellent and ideal anesthetic technic as spinal anesthesia is being discredited in some parts of the country, and when anesthesiologists are being deterred from using this method by fear of medicolegal consequences, a book such as this is indeed welcome. The reviewer hopes that careful study of this book will help to dissipate an emotional rejection of the method.

The author reviews the topic of spinal anesthesia from the viewpoint of its physiologic effects and limitations. The nine chapters deal with the effects of spinal anesthesia on the central nervous system, cardiovascular system, pulmonary function, hepatic function, renal function, endocrine system, metabolism, obstetric physiology, and the gastrointestinal tract.

There are several interesting and experimentally proved statements which can be verified by those with long clinical experience in spinal anesthesia. The reviewer agrees wholeheartedly with this statement: "In clinical practice there is no evidence to indicate that spinal anesthesia high enough to allow high intra-abdominal surgery is accompanied by concentrations of local anesthetics in the ventricular fluid great enough to depress either the respiratory or vasomotor centers. . . . Elevation of the head or reverse Trendelenburg position is one of the most frequent preventable causes of sudden death during spinal anesthesia." In the last statement, the author is referring to high spinal anesthesia with accompanying hypotension.

Again, in the chapter on obstetric physiology the reviewer finds two statements with which *thoughtful physicians* of experience will no doubt find agreement:

> Despite the fact that spinal anesthesia has theoretical advantages over general anesthesia insofar as the infant's respirations are concerned, it is doubtful whether these advantages matter when comparison is made between the neonatal death rate among full term infants delivered with well managed spinal anesthesia and the neonatal death rate in full term infants delivered under skillfully administered general anesthesia. The type of anesthesia is not of as great importance as are high standards of obstetrical and anesthetic care. As

a corollary, the type of anesthesia alone cannot compensate for poor obstetrical and anesthetic management. . . . Maternal deaths due to spinal anesthesia can be prevented, but only by full understanding of the pharmacological and physiological principles behind the method. If spinal anesthesia is to be safe in obstetrics, it *must* be given only by those experienced in the technic. It is doubtful whether the occasional anesthetist should administer spinal anesthesia to any patient, but they certainly should never do so to pregnant women.

This book is easily read and thought-provoking, and is highly recommended to the specialist in anesthesiology and obstetrics.

A. A. GOLDEN, D.O.

▶ SURGERY OF THE PROSTATE. By Henry W. Weyrauch, M.D., F.A.C.S.; Clinical Professor of Surgery (Urology); Chief, Division of Urology, Stanford University School of Medicine. Cloth. Pp. 535, with illustrations. Price $15.00. W. B. Saunders Company, West Washington Square, Philadelphia 5, 1959.

A complete resume of technics used for operative treatment of the prostate forms the substance of this book. The author gives his opinions as to which are the best and indicates the circumstances under which the less preferable technics might be applied. In addition, he has given considerable attention to the problems of preoperative and postoperative care and particularly to the management of fluid and electrolyte balance. Brief discussions of the problems encountered by the anesthesiologist are included, and mention is made of intercurrent disease where applicable, although no attempt is made to treat either of these subjects extensively. Illustrations are used and with some point. The book has been carefully edited and indexed, and it should prove a most valuable addition to the library of the surgeon or urologist.

▶ INTRACRANIAL CALCIFICATION. By Fermo Mascherpa, Chief of the X-ray Department, Milan Neurological Institute, Milan, Italy; and Vincenzo Valentino, Radiologist of the Institute of Semeiological Medicine, Naples University; Neuroradiologist of the Hospital "A Cardarelli," Naples, Italy. Cloth. Pp. 150, with illustrations. Price $9.50. Charles C Thomas, Publisher, 301-327 East Lawrence Avenue, Springfield, Illinois, 1959.

This book, which is of particular interest to the radiologist, is probably the only monograph in the English language on the subject of intracranial calcification, although references in periodical literature have been numerous in the past. The work is based on 153 cases studied at the Milan Neurological Institute, which were verified surgically, pathologically, or by means of clinical and laboratory corroboration. Many roentgenograms and diagrams are included in the book, almost all of them extraordinarily fine reproductions. Some aspects of nonpathologic calcification are discussed briefly, and the various manifestations of pathologic nontumoral calcification are dealt with at length. Emphasis is placed on differential diagnosis by means of x-rays, although some information is given about the conditions themselves and the pathology involved in each case. A list of references containing additional information is included, as is a fairly complete index.

▶ AIDS TO BACTERIOLOGY FOR NURSES. By E. Joan Bocock, S.R.N., S.C.M., D.N. (London), Principal Tutor at the Royal Free Hospital, London; formerly Sister Tutor at St. Thomas's Hospital, London; and Katharine F. Armstrong, S.R.N., S.C.M., D.N. (London), formerly Sister Tutor at King's College Hospital, London; and Editor of the "Nursing Times." Cloth. Pp. 175, with illustrations. Price $3.00. Baillière, Tindall and Cox, 7 and 8 Henrietta Street, W.C.2, London, 1959. The Williams and Wilkins Company, exclusive U.S. distributors, 428 East Preston Street, Baltimore 2.

A new addition to the fine Nurses' Aids Series has been produced, with a purpose of explaining bacteriology to students with particular emphasis on its relationship to nursing care. The authors have faced the problem of what should be included in such a book and arrived at the following answer: "If there should be any who think that the book goes more deeply into the subject than is necessary or desirable, we would say that we thought it better to err on the side of giving the nurse the opportunity of learning a little more, rather than a little less, of a subject which plays such an important part in hospital training." They go on to explain that certain of their material, particularly that found in the appendices, is suitable for reference rather than for memorization. The diseases described were chosen because they have been commonly seen by the student nurses who have come under their tutelage. The book is well illustrated and is very complete for its size, and as is characteristic of the series, extremely well put together and very practical.

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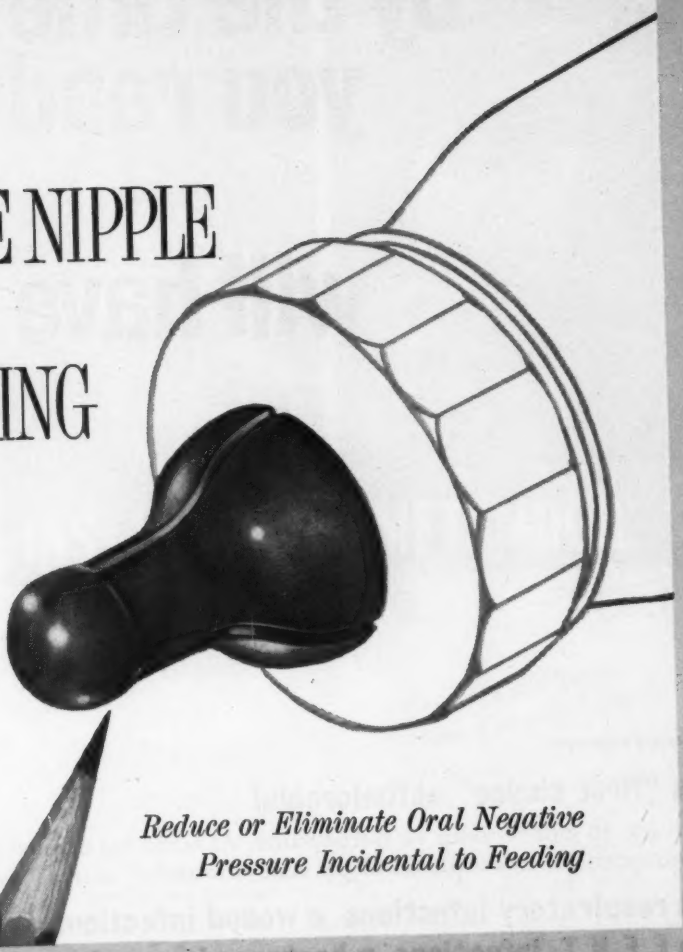

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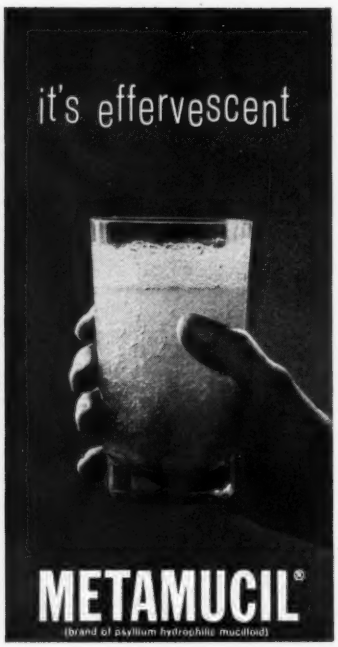

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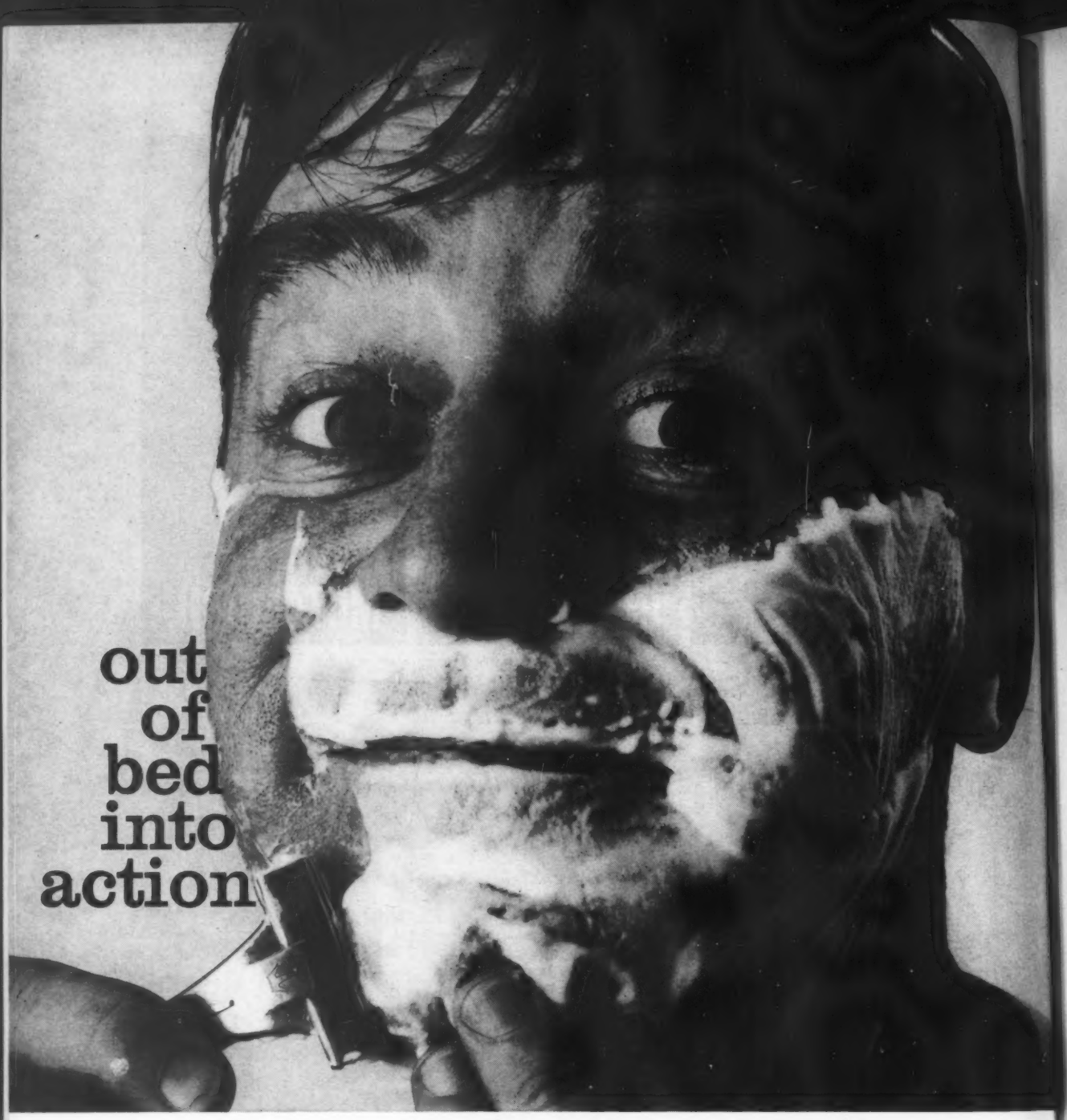

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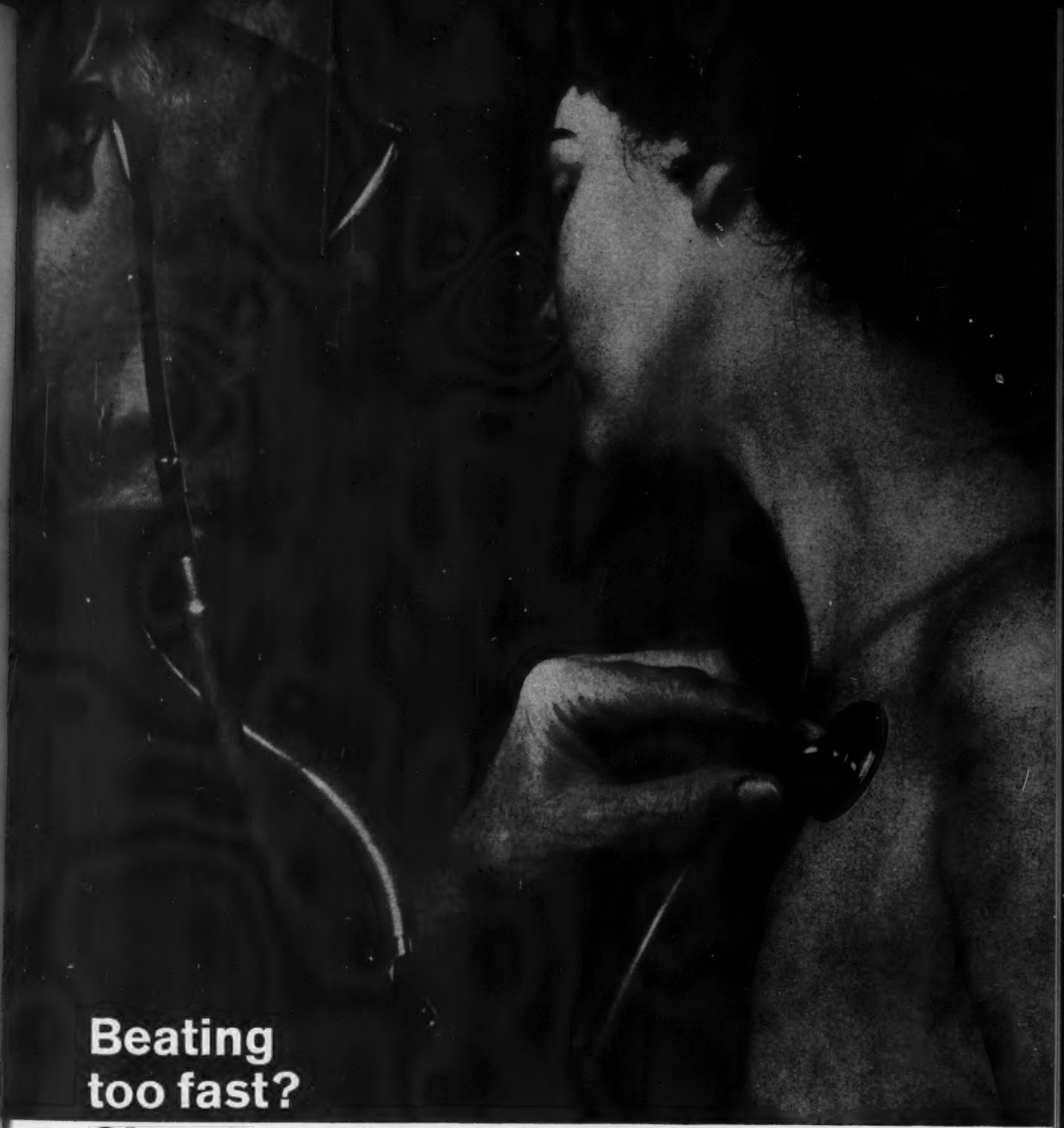

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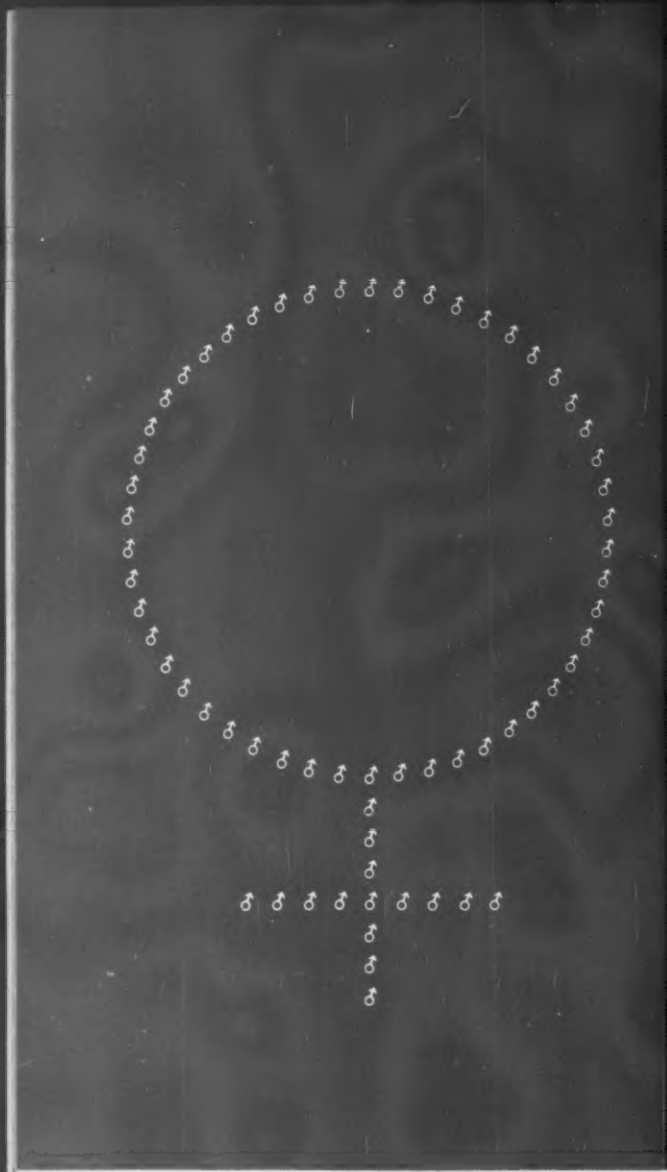

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* Marmell, M., and Prigot, A.: Tetracycline phosphate complex in the treatment of acute gonococcal urethritis in men. Antibiotic Med. & Clin. Ther. 6:108 (Feb.) 1959.

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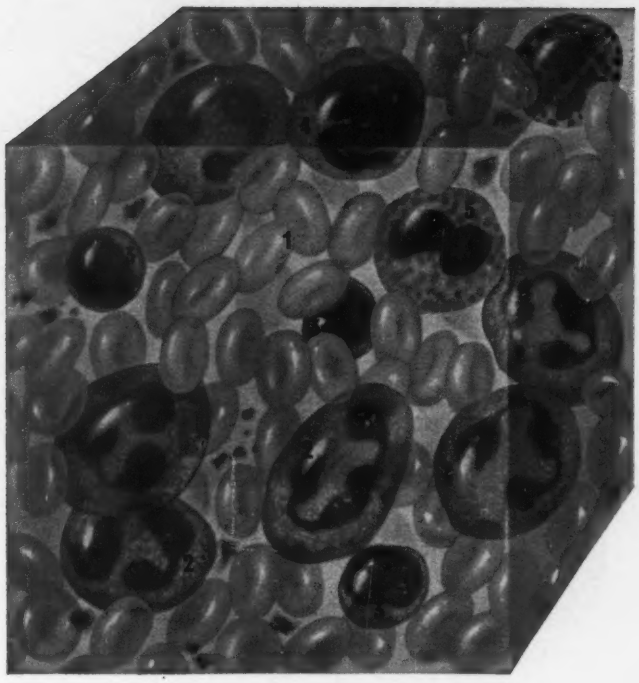

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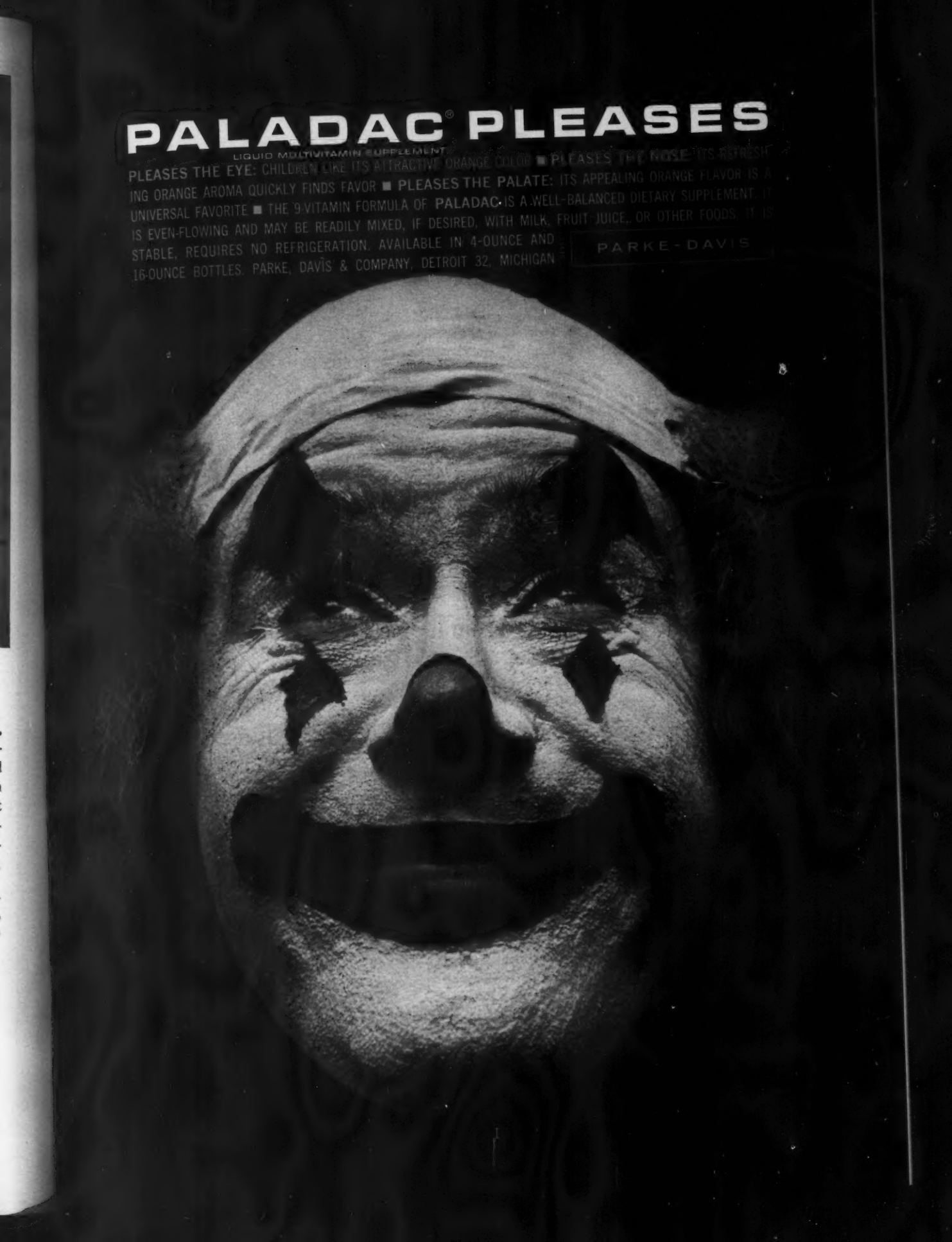
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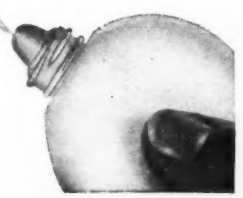

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1. Goldwasser, E.; Jacobson, L. O.; Fried, W., and Plzak, L. F.: Blood *13*:55 (Jan.) 1958. 2. Murdock, H. R. Jr.: Am. Pharm. Assoc. (Sci. Ed.) *48*:140, 1959. 3. Goldwasser, E.; Jacobson, L. O.; Fried, W., and Plzak, L.: Science *125*:1085 (May 31) 1957. 4. Center, W. M.: Clin. Med. *7*:713 (April) 1960. 5. Holly, R. G.: Obst. & Gynec. *9*:299 (Mar.) 1957. 6. Ausman, D. C.: Journal-Lancet *76*:290 (Oct.) 1956. 7. Flynn, R. T.: Therapy with Cobalt and Iron for Correction of Anemia in Pregnancy, Presented at Michigan and Wayne Co. Acad. GP. Postgrad. Clinic, Detroit, Mich., Nov. 11-12, 1959. 8. Tevetoglu, F., and Ozkaragoz, K.: M. Times *86*:81 (Jan.) 1958. 9. Craig, P. E.: Clin. Med. *6*:597 (April) 1959. 10. Hill, J. M.; LaJous, J., and Sebastian, F. J.: Cobalt Therapy in Anemia, Texas J. Med. *51*:686 (Oct.) 1955. 11. Tevetoglu, F.: J. Pediat. *49*:46 (July) 1956.

Please write for monograph, "The Hormone Erythropoietin." Roncovite literature also available on request.

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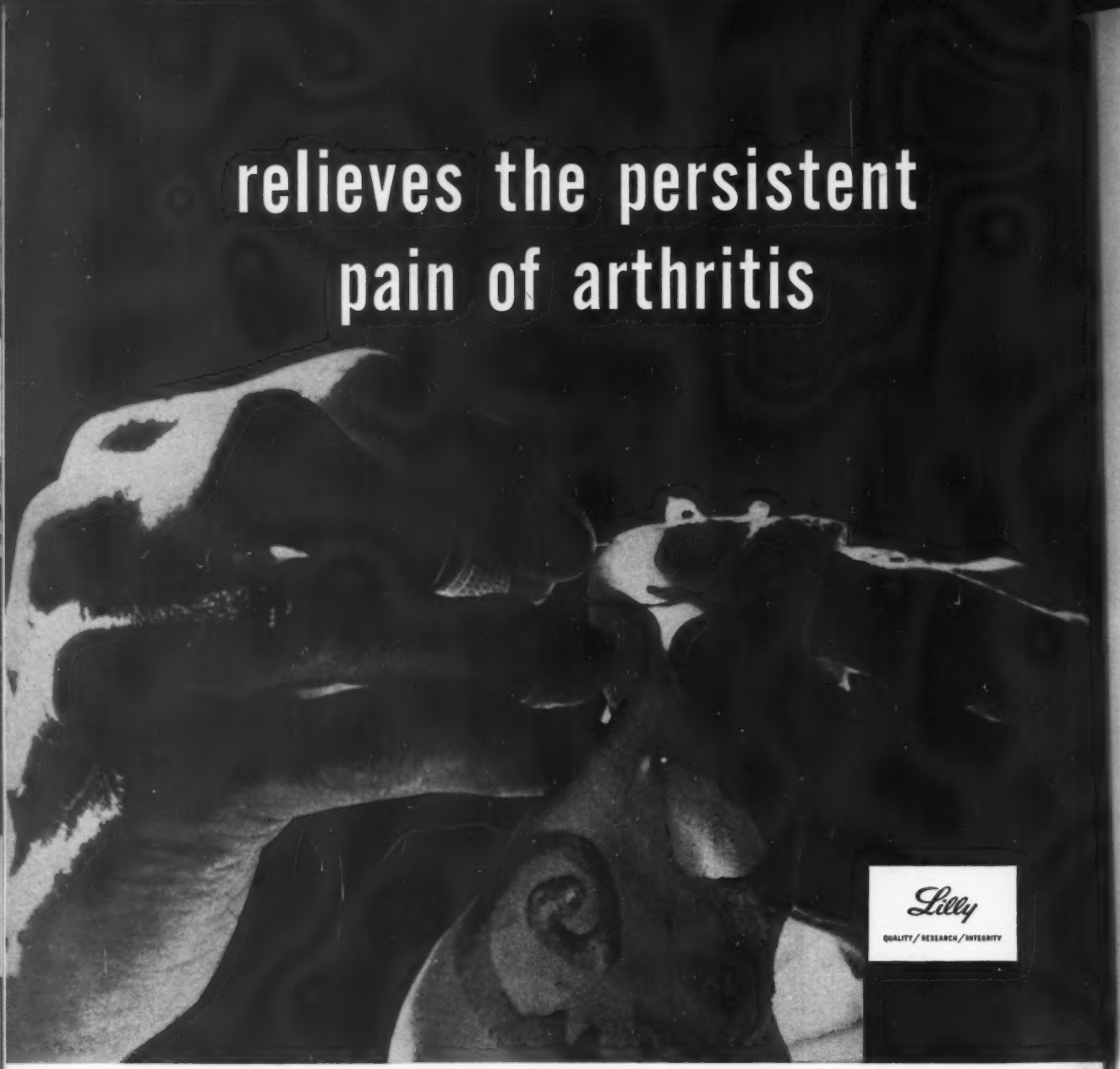

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Conventions and meetings

American College of General Practitioners in Osteopathic Medicine and Surgery, mid-year clinical meeting, Sheraton-Cadillac Hotel, Detroit, November 18-20. Executive Secretary, A. J. Schramm, 5880 San Vicente Blvd., Los Angeles 19.

American College of Osteopathic Internists, annual meeting, Denver, October 6-8. Secretary, Glennard E. Lahrson, 400 40th St., Oakland 9, Calif.

American College of Osteopathic Surgeons, annual meeting, Statler Hotel, Dallas, Texas, October 30-November 3. Executive Secretary, Mrs. E. F. Martin, P.O. Box 488, Coral Gables, Fla.

American Osteopathic Association, Sixty-Fourth Annual Convention, Muehlebach Hotel, Hotel Aladdin, Hotel Phillips, Municipal Auditorium, Kansas City, Mo., July 18-22. Program Chairman, Raymond L. Ruberg, 4614 Wayne Ave., Philadelphia 44.

Central States Osteopathic Society of Proctology, annual meeting, Hotel Olds, Lansing, Mich., September 16-18. Program Chairman, Ronald R. Emerick, 1228 W. Catalpa Dr., Royal Oak, Mich. Secretary, Lloyd B. Hoxie, 39011 Harper, Mt. Clemens, Mich.

Eastern States Osteopathic Society of Proctology, annual meeting, Hotel Bellevue-Stratford, Philadelphia, November 5-6. Program Chairman, J. Irving Schwartz, 5756 N. Fifth St., Philadelphia 20. Secretary, LeRoy W. Lovelidge, Jr., 201 E. Orange St., Lancaster, Pa.

Florida, annual meeting, Hotel Robert Meyer, Jacksonville, September 26-28. Program Chairman, Ralph L. Fischer, 333 Fourth Ave., Jacksonville Beach. Executive Director, Mr. Barton K. Johns, 5009 Central Ave., Tampa 3.

Kansas, annual meeting, Town House Hotel, Kansas City, Kansas, September 17-21. Program Chairman, Glen D. Jewett, Cornwell Bldg., St. John. Executive Secretary, Mr. Lloyd L. Hall, 121 E. 8th St., Topeka.

Michigan, annual meeting, Pantlind Hotel, Grand Rapids, October 3-5. Program Chairman, A. H. Fuller, 202 Liberty Life Bldg., Muskegon. Executive Secretary, Mr. Floyde E. Brooker, 81 Glendale, Highland Park 3.

Missouri, annual meeting, Sheraton-Jefferson Hotel, St. Louis, October 12-14. Executive Secretary, Mr. Paul D. Adams, 325 E. McCarty St., Jefferson City.

Montana, annual meeting, Glacier Park Lodge, East Glacier Park, August 5-6. Program Chairman, C. G. Sundelius, 7-9 K-M Bldg., Kalispell. Secretary, Donald H. Schmidt, 506 26th St., N., Great Falls.

Ohio, refresher course, Hotel Cleveland, Cleveland, October 22-23. Executive Secretary, Mr. William S. Konold, 53 W. Third Ave., Columbus 1.

Oklahoma, annual meeting, Biltmore Hotel, Oklahoma City, November 1-3. Program Chairman, Ernest T. Ross, 420 Commerce Bldg., Okmulgee. Executive Secretary, Mr. Walter L. Gray, 210-12 Braniff Bldg., Oklahoma City.

Osteopathic College of Ophthalmology and Otorhinolaryngology, annual meeting, Brown Palace Hotel, Denver, September 26-28. Executive Secretary, Arthur A. Martin, Box 472, Kirksville, Mo.

Pennsylvania, annual meeting, Sheraton Hotel, Philadelphia, November 17-19. Program Chairman, Charles Lichtenwalner, Jr., 379 Chestnut St., Pottstown. Executive Secretary, Mr. Thomas M. Fogarty, 1941 Market St., Harrisburg.

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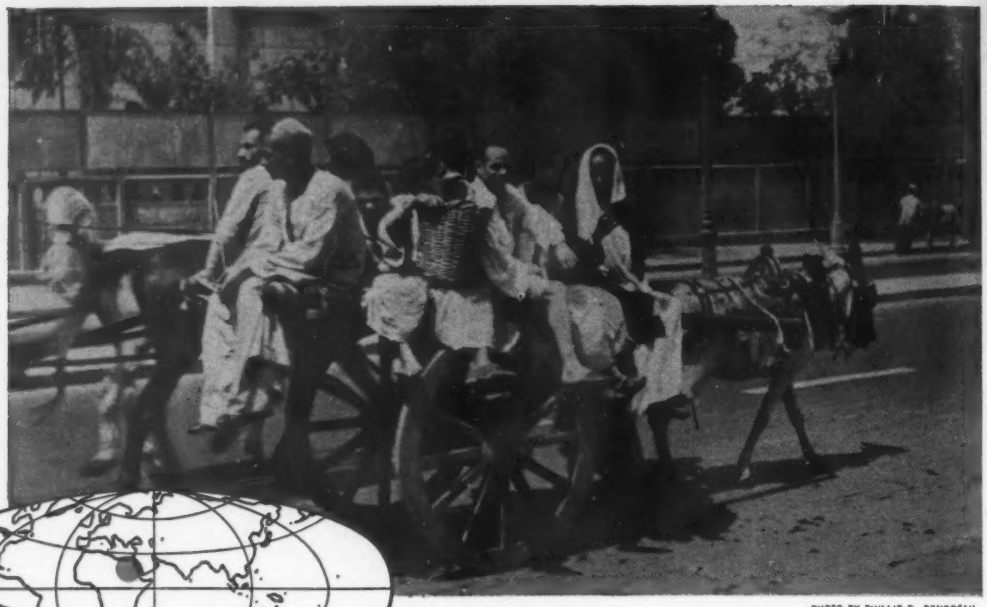

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Musgrave, M. E., and Arm, H. G.: Antibiotic Med. & Clin. Therapy 7:17 (Jan.) 1960.

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Western States Osteopathic Society of Proctology, annual meeting, Statler Hilton Hotel, Los Angeles, October 24-26. Program Chairman, Francis M. Neff, 2800 Pacific Ave., Long Beach 6, Calif. Secretary, Marcus S. Gerlach, 2015 State St., Santa Barbara, Calif.

West Virginia, midyear meeting, Greenbrier Hotel, White Sulphur Springs, October 16-18. Refresher course, October 17-18. Program Chairman, Albert Molisky, 570 Main St., Follansbee. Executive Secretary, Mr. Gilbert D. Brooks, 313 Berman Bldg., Charleston 1.

State and national boards

Arizona Those interested in professional examinations should contact Russell Peterson, D.O., secretary, Osteopathic Board of Registration and Examination in Medicine and Surgery, 2747 E. McDowell Rd., Phoenix.

Basic science examinations September 20. Address Herman E. Bateman, Ph.D., secretary, State Board of Examiners in the Basic Sciences, University of Arizona, Tucson.

Arkansas basic science examinations October 20-21. Address Mr. A. W. Ford, commissioner, Department of Education, Little Rock.

Colorado basic science examinations September 7-8. Applications must be filed by August 24. Address Esther B. Starks, D.O., secretary, Basic Science Board, 1459 Ogden St., Denver 18.

Connecticut basic science examinations October 8. Address Miss M. G. Reynolds, executive assistant, State Board of Healing Arts, 110 Whitney Ave., New Haven 10.

Hawaii For information on examination dates write to Richard Y. Kodama, D.O., secretary, Board of Osteopathic Examiners, 826 Keeaumoku St., Honolulu 14.

Illinois examinations October 11-13 at 160 N. LaSalle St., Chicago. Applications must be filed by the middle of September. Address Mr. Frederic B. Selcke, superintendent, Department of Registration and Education, Capitol Bldg., Springfield.

Iowa basic science examinations October 11 at the Capitol Building, Des Moines. Address Elmer W. Hertel, Ph.D., secretary, Board of Basic Science Examiners, Wartburg College, Waverly.

Maryland examinations in October. Address Christopher L. Ginn, D.O., secretary, State Board of Osteopathic Examiners, 19 W. Mulberry St., Baltimore 1.

Michigan basic science examinations October 14-15. Applications must be filed 2 weeks in advance. Address Mrs. Anne Baker, secretary, State Board of Examiners in the Basic Sciences, 116 Mason Bldg., Lansing.

Minnesota appointed to the State Board of Osteopathic Examiners is Clifford F. Dartt, D.O. At a subsequent meeting he was elected secretary-treasurer, and Robert Clark, D.O., and E. C. Goblirsch, D.O., were elected president and vice president, respectively.

Basic science examinations October 4. Applications must be filed by September 10. Address Raymond N. Bieter, M.D., secretary, State Board of Examiners in the Basic Sciences, 105 Millard Hall, University of Minnesota, Minneapolis 14.

Montana examinations September 6. Address Warren E. Monger, secretary, State Board of Osteopathic Examiners, Box 64, Dillon.

Nebraska basic science examinations October 4-5. Address Mr. R. K. Kirkman, director, Bureau of Examining Boards, Department of Health, State Capitol Bldg., Lincoln 9.

New Hampshire examinations September 14-17. Address Edward W. Colby, M.D., secretary, State Board of Registration in Medicine, State House, Concord.

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1. Melville, K. I., and Lu, F. C.: Canadian M.A.J., *65*:11, 1951. 2. Bovet, D., and Nitti-Bovet, F.: Arch Internat. de pharmacodyn. et therap., *83*:367, 1946. 3. Fuller, H. L., and Kassel, L. E.: Antibiotic Med. & Clin. Therapy, *3*:322, 1956.

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*Kinross-Wright, J.: Newer phenothiazine drugs in treatment of nervous disorders, J.A.M.A. 170:1283, July 11, 1959.

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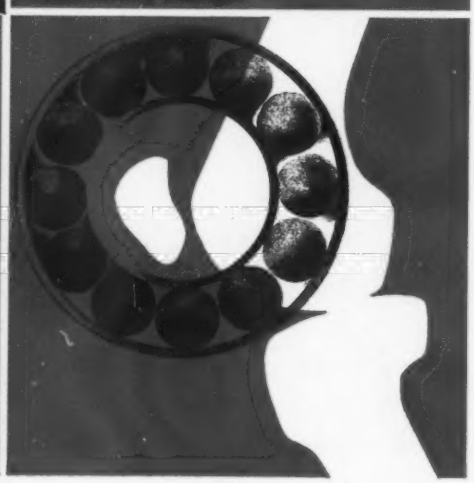

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New Jersey examinations October 18-21. Applications must be filed by September 28. Address Mr. Michael E. H. Sweeney, administrative secretary, State Board of Medical Examiners, 28 W. State St., Trenton 8.

New Mexico basic science examinations October 16. Address Mrs. Marguerite Cantrell, secretary, Board of Examiners in the Basic Sciences, Box 1522, Santa Fe.

Oregon applications for reciprocity will be considered in October. Address Mr. Howard I. Bobbitt, executive secretary, State Board of Medical Examiners, 609 Failing Bldg., Portland 4.

Puerto Rico examinations September 6. Address Mr. Joaquin Mercado Cruz, secretary, Board of Medical Examiners, Department of State, Box 3271, San Juan.

Rhode Island examinations October 6-7 at Providence. Address Mr. Thomas B. Casey, Administrator of Professional Regulation, 366 State Office Bldg., Providence.

Basic science examinations August 10 at Room 366, State Office Bldg., Providence. Applications must be filed 2 weeks in advance. Address Mr. Casey.

South Dakota examinations July 19-20. Address Mr. John C. Foster, executive secretary, State Board of Medical and Osteopathic Examiners, Room 300, First National Bank Bldg., Sioux Falls.

Tennessee examinations in February and August at Nashville. Address M. E. Coy, D.O., secretary, Board of Examination and Registration for Osteopathic Physicians, 1226 Highland, Jackson.

Basic science examinations given every 3 months. Address O. W. Hyman, M.D., secretary, Board of Basic Science Examiners, 62 S. Dunlap, Memphis 3.

Utah examinations September 18-24. Applications must be filed 10 days prior to examination. Address Mr. Frank E. Lees, director, Registration Division, Department of Business Regulation, State Capitol, Salt Lake City 14.

West Virginia examinations in October. Address Donald C. Newell, D.O., secretary, State Board of Osteopathy, 137½ Main St., Oak Hill.

Wisconsin examinations in October. Applications must be filed 2 weeks prior to examination. Address Thos. W. Tormey, Jr., M.D., secretary, State Board of Medical Examiners, Room 28, 115 So. Pinckney St., Madison 2.

Basic science examinations September 9, Room 145, Birge Hall, University of Wisconsin, Madison. Applications must be filed by August 31. Address Mr. W. H. Barber, secretary, State Board of Examiners in the Basic Sciences, 621 Ransom St., Ripon.

Wyoming examinations October 3 at Cheyenne. Address James W. Sampson, M.D., secretary, State Board of Medical Examiners, State Office Bldg., Cheyenne.

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Examinations in Part I consist of anatomy, including histology and embryology; physiology; physiological chemistry; general pathology; and bacteriology, including parasitology and immunology.

Part II consists of examinations in surgery, including applied anatomy, surgical pathology, and surgical specialties; neurology and psychiatry; public health, including hygiene; medical jurisprudence; obstetrics and gynecology; pediatrics; osteopathic principles, therapeutics, including pharmacology and materia medica.

Part III is an oral and practical examination given under the supervision of a chief examiner who is a member of the Board and by a panel of associate examiners. Subjects covered in Part III are:

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Council on Drugs: New and Nonofficial Drugs, Philadelphia, J. B. Lippincott Co., 1959, p. 661.

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These are oral examinations which the candidate may take after having satisfactorily completed the first six months of a 1 year internship in a hospital approved by the American Osteopathic Association for intern training. Part III is given annually.

All candidates who are now serving an internship may file an application for Part III when 6 months of the internship have been completed. All others eligible for Part III whose internship of 1 year has been completed may file at any time. All applications must reach the office of the secretary not less than 30 days prior to the examination.

All candidates are reminded that the examinations must be completed within a period of 7 years. Candidates who took Part I in 1954 must take Part III in 1961 or forfeit the right to complete the examinations.

The dates of the 1961 Part III examinations will be announced in the November issue of THE JOURNAL and THE FORUM.

Eligibility requirements are as follows: Part I, satisfactory completion of the first 2 quarters or trimesters of the sophomore year in an approved school of osteopathy; Part II, satisfactory completion of Part I and of the first two quarters or trimesters of the senior year in an approved osteopathic college; Part III, satisfactory completion of Part II and at least 6 months of a 1-year internship approved by the American Osteopathic Association.

Applications must be filed with the secretary of the Board not less than 30 days prior to the examination dates.

Address all communications to Paul van B. Allen, D.O., secretary, 4425 N. Meridian St., Indianapolis 8.

Reregistration of osteopathic licenses

Within 60 days after July 1—Indiana, $5.00 residents; $10.00 non-residents. Address Miss Ruth V. Kirk, executive secretary, State Board of Medical Registration and Examination, 538 Knights of Pythias Bldg., Indianapolis 4.

September 1—Nebraska, $3.00. Address Mr. R. K. Kirkman, Director of Bureau of Examining Boards, State Department of Health, Lincoln 9.

September 1—Ohio, $2.00. Address James O. Watson, D.O., 111 West Third Ave., Columbus 1.

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In order to find solutions to the questions mentioned above we had to have some notion of the problem with which we were dealing. Through experience we have come to view the child with an amputation as presenting a multi-faceted

*Reprinted from *California's Health*, March 15, 1960.

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problem. Linked together and interacting with each other are physical, mechanical, learning, emotional, and social facets of the amputation-prosthetics problem. Consequently, no one discipline or person can cope with this problem independently. The treatment of the amputee requires the knowledge, skill, and experience of a variety of disciplines working in close cooperation. The CAPP interdisciplinary group includes personnel from pediatrics, orthopedics, occupational and physical therapy, engineering, prosthetics, psychology, and social work.

It has been found that a prosthesis could be checked out for its mechanical efficiency, but the child and his family had to be motivated to use it in order to test out its functional effectiveness as well as its mechanical efficiency. Training methods that would utilize the learning patterns of children had to be linked with the mechanical device and the emotional readiness to take on this task. An inefficient mechanical device could frustrate the learner and defeat the efforts of the trainer. On the other hand a mechanically efficient device produced little benefit when the patient and family showed a lack of readiness to accept the device and the training program.

FAMILY-CENTERED PROGRAM

As we looked at the child we knew his world of work, play, and support was centered largely in his family. Therefore the appropriate testing ground for equipment and learning was in daily living activities within his home and his community. In essence the CAPP uses the family as the base or laboratory for the testing of mechanical equipment and training methods. In order to have the family as such a base, the Project's clinical practice is organized to involve the family in the total prosthetics program. The child is not hospitalized, but lives at home or with his parent in a nearby motel during the time his presence is needed at the Project. The prosthetics program for the patient and his family can be described as a continuum involving three stages: Preparatory Work-up, Fitting-Training Sequence, and Follow-up Supervision and Evaluation.

The child amputee and his family are accepted for preparatory work-up when appropriate and desired by the parents. Referrals come from the parents, school personnel, physicians, and Crippled Children Services. During the preparatory work-up each of the disciplines completes an evaluation in keeping with his special field. At the same time, the child and his parents learn about the program and their responsibility for participation in it. If the staff, child and parents concur that a prosthesis will be advantageous to his development, a prescription is written. If any of those involved believe the fitting of a prosthesis will not prove advantageous at that time, the factors contributing to this decision are considered and a prosthesis may not be prescribed. Modification of attitudes, physical therapy, or surgical procedures may be necessary steps before a prosthesis would be beneficial. The nature of the amputation may be such that a prosthesis would not provide sufficient assistance to warrant the child's wearing an artificial device. Partial hands fall most frequently into this area, and surgical revision at that time or at a later time may be recommended.

After the prosthesis has been fabricated, it is checked out for its mechanical efficiency by the Project's prosthetist, therapist, and physician. Immediately following this the parents and child are introduced to the function and care of the prosthesis by the occupational or physical therapist. Although it is the child who will be making use of the prosthesis, it has been found essential for the parents to have understanding of its function and limitations. When the parents have a realistic understanding of the prosthesis as an assistive device for their child, they can have appropriate expectations for his performance. The securing of a prosthesis is a new experience for the parents as well as the child. At the Child Amputee Prosthetics Project the social worker assists the parents to anticipate and plan for situations that will ease the transition from use of the stump to use of the prosthesis. At the same time the occupational or physical therapist introduces activities in keeping with the child's developmental needs. The brothers and sisters of the patient are encouraged to participate in some portions of the training sessions. Through

this inclusion they learn that training is not necessarily a special play period for the patient, and that they also have an important function in the prosthetic program. The family provides the first testing ground for acceptance of the child wearing a prosthesis. Experiencing acceptance within the family can give the child greater ability to meet people and situations outside the family. Questionable acceptance of the use of prosthesis within the family ill prepares the child for functioning in a two-handed world.

FOLLOW-UP AFTER INITIAL TRAINING

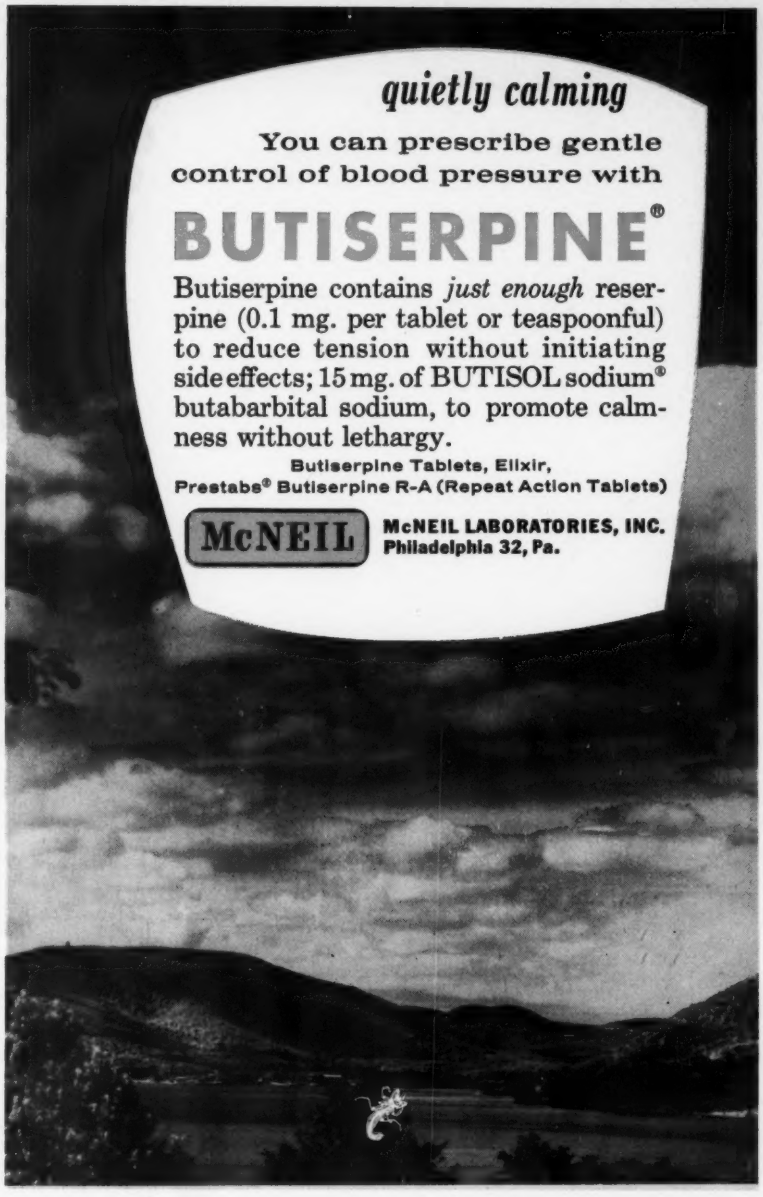
After a concentrated period of initial training that may be from five to fifteen or more sessions (depending on the complexity of the prosthetics problem), the child continues to receive regular training on a less concentrated basis. This training is carried out in the child's own community, and the therapist is an excellent liaison with the family, the school, and with the Child Amputee Prosthetics Project. Follow-up evaluations are scheduled regularly at the Project at which time new mechanical components may be introduced or changes in training methods recommended.

The social worker, psychologist, and physician provide such services as are essential for the child and his family to make the best use of the total prosthetics program, but no attempt is made to supplant regular or comprehensive medical, social, or psychological treatment programs.

VARIOUS APPROACHES USED

With a clinical practice that includes a comprehensive preparatory work-up and a consistent and sustained follow-up, it has been possible to observe and test out a variety of approaches to the child with an amputation. It is now the practice to fit the child with a shoulder disarticulation type of amputation when he is able to maintain independent standing balance. For those children having above or below elbow amputations, it is the practice to fit them when they can sit independently. For the child with a leg amputation, the prosthesis is introduced when he shows desire to pull himself up to standing position. It has been noted when circumstances have prevented fitting the child when he shows this desire to pull himself up that there may be considerable lag in his learning to make use of the leg. It would appear that when the height of the drive to stand has passed, he goes through a period of contentment with remaining on the floor. In all of the learning patterns that have been observed in making use of both upper and lower prostheses, there is a sequence which is comparable to the learning patterns of children without amputations. Taking advantage of natural learning patterns has been the key to prosthetic training.

When children have lost a limb through accident or surgical necessity, fitting and training should be introduced as soon as medically permissible. The shorter the interval of time between loss and fitting, the less unlearning will have to take place. The unlearning includes, not only the way a person adapts to doing without a limb, but also the way he develops attitudes and thinking about himself.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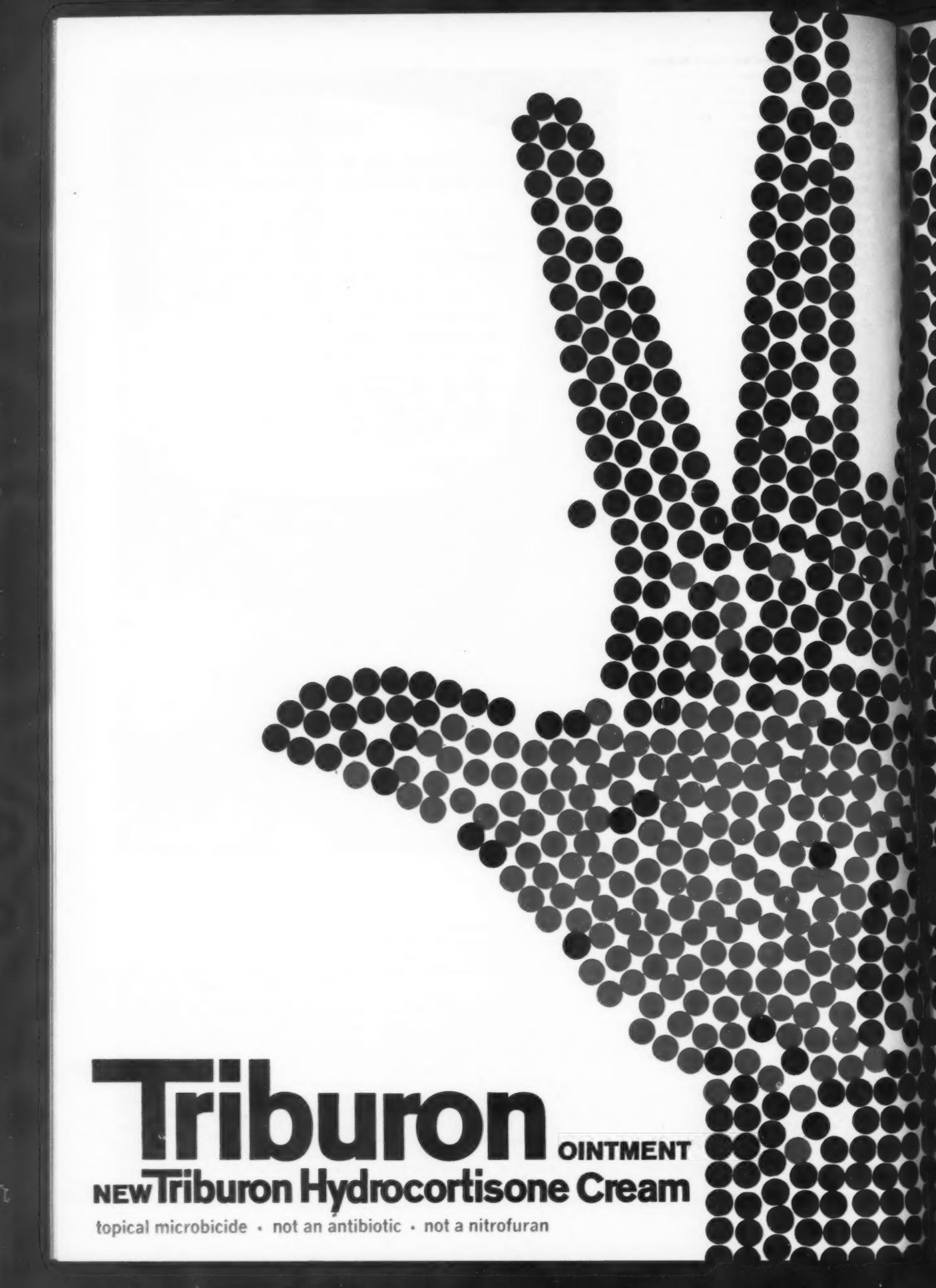
ADJUSTMENT WITH GROWTH

It had been assumed that prostheses would have to be re-fabricated frequently for a growing child. It has been proven, however, that an upper-extremity prosthesis fitted on a seven- or eight-months-old infant can be retained and be useful for at least two years. When fitted at that age the infant has "baby fat" which changes into firm tissue, and the circumference remains relatively the same. At CAPP the infant is first fitted with a small plastic-covered hook (Dorrance 12P), which is later replaced at about two years of age with a larger plastic-covered hook (Dorrance 10P). The larger hook adds length to the artificial arm and remains in proportion to the length of the sound arm. It also increases the size of grasp essential for a greater variety of activities. The plastic sockets for all the prostheses are made thicker than is necessary for strength, allowing room for sanding out to take care of increased circumference growth of the stump. Larger sized hooks again compensate for lineal growth of the sound arm.

Lower extremity prostheses require rather precise fitting and may have to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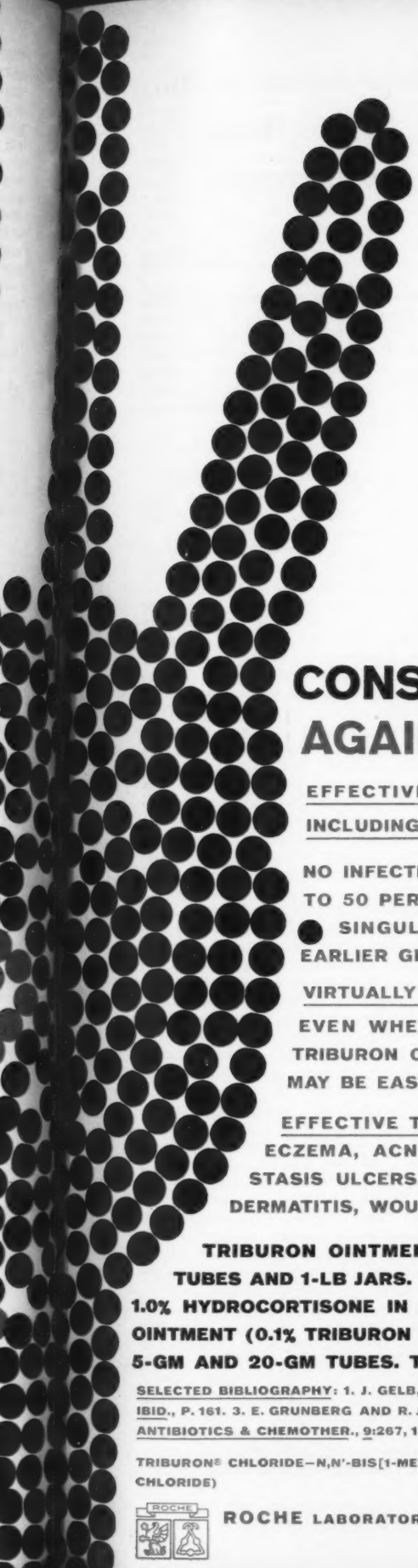

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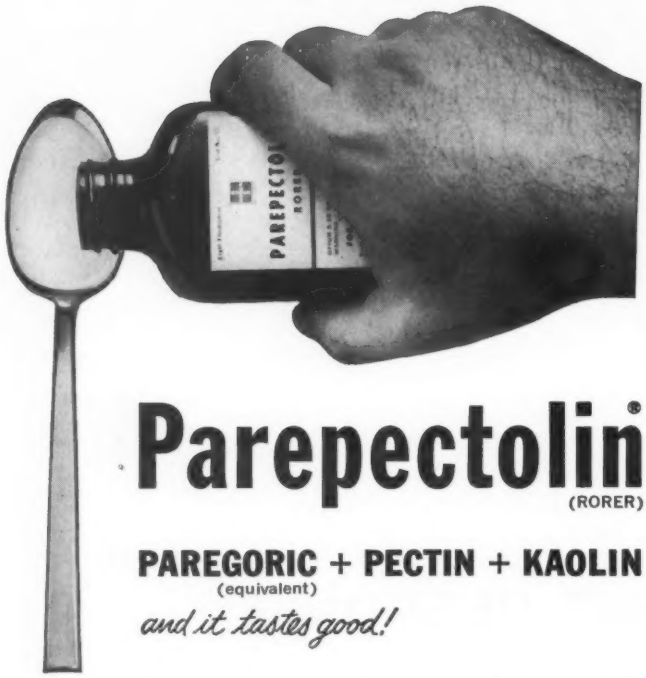

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be altered more frequently than upper extremity prostheses. However the use of liners has tended to reduce the number of changes due to circumference growth. A number of measures are under investigation to add length to the artificial leg without requiring complete re-fabrication.

NEW DEVELOPMENTS STIMULATED

New developments in the design and fabrication of prostheses are stimulated through the close association of the staff members themselves and through testing for functional effectiveness in the day-by-day, year-by-year evaluation of the patient in his environment. There has been much learning during the past five year's existence of the Child Amputee Prosthetics Project. There is much learning to be done. An effective approach to the answer of one question stimulates the asking of additional questions. It is safe to say there will be no lack of questions to pursue. Children continue to be born without arms and legs and with anomalous extremities. Accidents and disease, causing the need for removal of limbs, continue to exist. The child with an amputation presents a complexity of needs requiring coordinated and creative solutions. The Child Amputee Prosthetics Project, with its interdisciplinary approach to the child within his family, is just one group seeking ways to help the child with an amputation learn to meet his adult obligations.

Impressions of the White House conference*

Kathryn Close

A nonofficial personal report of the Golden Anniversary White House Conference on Children and Youth, based on personal observations at the Conference sessions, conversations with participants, reading of speeches, abstracts, and press releases, and notes from colleagues and other friends.

"I have an unshakable faith in the overwhelming majority of fine, earnest, high-spirited youngsters who comprise this rising generation of Americans."

So spoke the President of the United States on the evening of March 27, 1960, to the gathering of 11,000 persons assembled for the opening of the Golden Anniversary White House Conference on Children and Youth. Of those attending, some 7,600—including about 1,400 youths of high school and college age and 500 foreign visitors—were official delegates to the Conference. They spent the following 5 days in groups of various sizes, scattered throughout the hotels and public buildings of Washington, considering the state of affairs among children and youth across the Nation and making recommendations for improvement. Their stated purpose: "to promote opportunities for children and youth to realize their full potential for a creative life in freedom and dignity." The result at week's end: over 1,000 specific recommendations directed to almost every conceivable type of organization and individual having a bearing on the lives of young people—the President, the Congress, Federal agencies, State and local governments, specific industries, the various helping professions, social and health agencies, churches, schools, community planners, police, courts, housing officials, adults in general, parents, "the family," and young people themselves.

The conferees had come from all 50 States and the District of Columbia, Puerto Rico, the Virgin Islands, Guam, and Samoa, and from 73 foreign countries. They included clergymen, industrialists, union leaders, soldiers, sailors, farmers, social workers, nurses, educators, doctors, lawyers, Indian chiefs, Congressmen, policemen, judges, writers, broadcasters, practitioners of a variety of other vocations, housewives, and students. In short, this was a citizen's conference. The conferees' only common denominator, as Mrs. Rollin Brown, chairman of the President's National Committee, pointed out at the opening session, was their concern for the young.

*Reprinted from *Children*, May-June 1960.

The participants had shown concern for children and youth, as had many thousands of other adults and young people across the land, in their preparatory work for the Conference back in their home communities through local or State committees or through the national organizations with which they were affiliated.[1] They brought to the Conference not only the results of their own inquiries, but information gained through their perusal of the eight volumes of material on children and youth prepared for the Conference, two of the volumes based on their own pre-Conference efforts and the others prepared by experts of various kinds. That these materials, though still almost "hot off the press," had already been widely read became clear in workgroup after workgroup, where participants would refer to one of the background or technical papers or a chart to make a point.

This was the largest Washington gathering of the six White House Conferences on Children called by Presidents of the United States since 1909.[2] It was largest in numbers of delegates and program participants—850 speakers, meeting chairmen, leaders, and resource people—and in scope of concern.

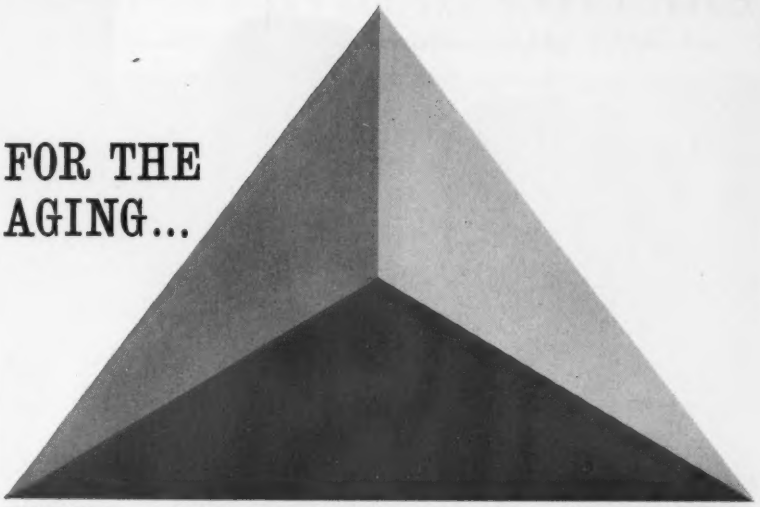
For the first 3 full days of the Conference, each delegate began the day listening to speakers at one of 5 concurrent Theme Assemblies, devoted successively to the subjects: Appraising Ideals and Values in the Changing World of Children and Youth; Assessing the Impact of Change on Children and Youth; and Adapting to Change and Innovation—the Effects on Children and Youth of Science, Technology, Population Pressures, and World Events. Following the Theme Assemblies came 18 concurrently held Forums, each with a different general topic: 9 concerned with various aspects of The World Around the Young—environment, mobility, support, nurture, opportunity, free time, mass communications, human resources, and beliefs; and 9 with various aspects of The Young in the World—moving toward maturity, from birth to puberty; moving toward maturity, from puberty to young adulthood; as learners and thinkers; as doers; as citizens; with mental handicaps, with physical handicaps, in conflicts, and with social handicaps.

After hearing speeches at his assigned Forum each conferee spent the first three afternoons of the week in one of 210 small workgroups, hammering out recommendations on one aspect of his Forum's topic—ranging in specificity from "the significance of a personal faith for children and youth" to "identification and treatment of the mentally retarded"—for presentation to the Forum on Thursday for a vote. Thus each recommendation submitted by the workgroup, after duplicates were weeded out by topic teams composed of representatives from workgroups of the same topic, were accepted or rejected through a vote of the 400 or so people in a Forum, but none were voted on by the Conference as a whole. The closing session on Friday, with the 7,600 participants assembled at the National Guard Armory, was devoted to summary, appreciations, and ceremony.

Assignments to workgroups and Forums were made by an IBM machine "concerned" both with the participant's stated interest and the wider interest of keeping balance of representation in each group. Youth participants were a part of every group.

In spite of its bigness this Conference was notable in its degree and spread of individual participation. As the workgroups contained only about 30 people each, and were broken down each day into small buzz sessions of five or six people each, it was almost impossible for any delegate to be a listener only. "Almost" is used here advisedly for, in spite of the set structure and procedures, what happened in the workgroups was as various as human personalities. There were extra-permissive workgroup leaders who did little to provoke any discussion at all, leaders who always steered the discussion away from controversial issues, leaders who tried to guide the group into their own way of thinking, and leaders who exhibited unusual skill at helping people express their own ideas, holding down the unscheduled speechmakers, keeping the discussion to relevant issues, and giving everyone a chance to have his say.

There were youth who were aggressively conservative—"juvenile delinquents ought to be punished more severely"; youth who were aggressively progressive—to the point of using their free time away from the Conference to organize



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picket lines in support of the Southern student lunch counter "sit-ins"; youth who tried to say something but out of politeness or shyness couldn't break into adult-dominated discussions; youth who had to be prodded into saying anything at all. There were adult participants who talked too much, adults who did not talk at all; adults who both talked and listened.

Yet, with all the variety of the participants' background, personalities, and focuses of attention, out of their deliberations emerged some major threads of concern, showing up in session after session no matter what the assigned subject of discussion. The President anticipated some of these on the opening night when he spoke of the importance of their mission:

"First . . . you are working with the most precious resource of our Nation: a whole generation of Americans who will someday make their country's policies and dispose its great power. . . .

"Second, this process of preparation for tomorrow's leadership grows increasingly difficult as rapid and momentous changes alter the look of tomorrow's world. . . .

". . . within this great context of change and accommodation there are certain imperishable values which must neither be changed nor abandoned. . . .

". . . For civilization is a matter of spirit; of conviction and belief; of self-reliance and acceptance of responsibility; of happiness in constructive work and service; of devotion to valued tradition. It is a religious faith; it is a shared attitude toward life and living. . . ."

The President singled out juvenile delinquency as a problem of worldwide concern to which the Conference must address itself. Pointing out that its causes are "multiple," he said that "multiple measures must be used to weed them out." Yet he warned against a tendency to generalize pessimistically about today's youth and asserted that a "happy family" was the surest way of preventing failures.

THE SEARCH FOR INTEGRITY

A similar accent on values prevailed throughout the Conference—inevitably no doubt because of the Conference theme and programing, but obviously also because of a deeply felt concern on the part of many speakers and delegates over what they regard as threats to personal and social integrity in American life today. This emerged not only in the speeches presented at the Theme Assemblies devoted to "Appraising Ideals and Values," but also in almost all other parts of the Conference, no matter what the assigned subject of consideration. Closely entwined were other obvious threads of prevalent concern—the desire to wipe the blight of racial discrimination from the American scene as quickly and as painlessly as possible and the desire to enhance the quality of education for all children.

There were those at the Conference who apparently did not share the President's faith in the youth of the Nation. They spoke of "softness," "boredom," and "lack of commitment." Two speakers quoted the lines from William Butler Yeats:

> "The best lack all conviction, while the worst
> Are full of passionate intensity."

The blame was put squarely on the adult world and the gap between precept and example. The culprits named were various—most frequently parents, often the school, sometimes the mass media of communication, sometimes public figures—but whoever the adults under fire the poison in American life was unequivocally identified as an accent on materialism.

Nobody, of course, suggested a return to the days when one-third of the Nation was "ill-fed, ill-housed, ill-clothed." On the contrary, considerable Conference attention—in oratory, discussions, and recommendations—was given to ways of bringing a greater proportion of the products of our material affluence to the still considerable proportion of our population living at bare- or sub-subsistence levels—a group estimated by one speaker to be 20 to 25 percent. Among the many suggestions which eventually became recommendations were increasing minimum wages and extending minimum wage laws to migrants and other uncovered workers, opening employment opportunities to members of minority groups, eliminating residence requirements for all health and welfare services, increasing unemployment benefits, broadening disability provisions of the social insurance program, and inquiring into the desirability of a system of family allowances.

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Yet a widespread uneasiness about the possible toxic byproducts of affluence was clearly evident. Juvenile delinquency was reported as more prevalent in times of prosperity, and one cause suggested was the resentment of the socially and economically disadvantaged portions of the youthful population at their inability to share in the opportunities to get the things that today stand for success. "To cure delinquency," said one speaker, "we must cure ourselves."[3]

Another speaker saw our society as "30 seconds to midnight," its only hope lying in a rather immediate filling of "the vacuum at the value core"—both in the inner man and in the social structure.[4] Another, calling for "a defense in depth," maintained that "moral and spiritual values must never be dealt with in isolation from social issues."[5] He and many others called for full acceptance of minorities as a moral imperative.

YOUTH RESPONSIBILITIES

Of the 500 foreign visitors at the Conference only one was a program speaker. He urged the participants to consider how young people could be helped to develop "those technical and above all human qualities which can be used for the benefit of mankind"—how children could be helped "not only to receive and gain, but to give and share."[6] That some attention was given this possibility was attested to by a recommendation from one workgroup for a youth technical assistance corps to work in other countries for the betterment of living conditions. A few other speakers also had their sights on the world at large. Said one: "Am I my brother's keeper? there is only one answer: 'Yes'—for if you are not, there is no future to mankind."[7]

The rapidity of social change and the complexity of the economy were frequently cited as causes of a sense of individual helplessness among both youth and adults. As one youth said in a workgroup: "I'm part of a generation that is faced with evidence daily that the H-bomb may drop tomorrow. We need something that tells us that life is worth something—has meaning." But an assembly speaker saw the complexity of life today as an opportunity for personal fulfillment through the acceptance of cooperative social responsibility. "It has been well said that today's hero like today's saint must be an organization man."[8]

An educator contended that youth had "little of the crusading spirit."[9] But this and the many statements about youth's lack of conviction seemed to be belied by the actions of many of the young participants at the Conference. Groups of young people held caucuses throughout the week to plan strategy for "getting things done." They served notice of their intention to rally support for strong Conference recommendations endorsing racial desegregation in all phases of American life. One youthful chairman of a Theme Assembly announced at the close of the session that the Southern students protesting lunch-counter discrimination "will not stand alone."[10] Many of the scores of antidiscrimination recommendations passed in the Forums were originally introduced by young people in workgroups.

The young people, of course, were not unanimous in their points of view. While only isolated protests against desegregation as an eventual goal were heard in any part of the Conference, an effort to keep the antidiscrimination recommendations from being specific was led by a group of youth from Northern States who were circulating a petition that the Conference confine itself to endorsing "human rights." At the Youth Evaluation meeting on Thursday, where Danny Kaye was moderator, some parliamentary confusion complicated a battle over whether the words "in due time" should be substituted for the words "by 1970" in a recommendation calling for "substantial completion of school desegregation." However, the suggested substitution was eventually soundly defeated. This resolution, which was one in a list of "youth priorities" presented to the Conference also called for the provision of equal access to housing for all individuals and elimination of discrimination in employment practices, and affirmed "the right of nonviolent resistance against all forms of social injustice."

JUVENILE DELINQUENCY

Though concern for juvenile delinquency had its own setting in a Forum called "The Young in Conflict" and in 12 workgroups, opinions on what or who is to blame for its rise and on what to do about it came from almost all parts of

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the Conference. The expressions of the experts backed up the President's statement that it arises from many factors and that, therefore, many measures are needed to combat it. But the "experts" seemed divided on whether social or individual psychological factors bore most weight in its causation, as well as on the priorities in efforts to combat it. One speaker, a sociologist, called delinquency "the dark underside" of a general societal advance, caused by social dislocations and educational pressures and predicted that the increase in its incidence would not long continue.[11]

Other diverging points of view emerged in discussions of efforts to identify potential delinquents early. Two workgroups produced recommendations urging greater efforts to find children in early life who are "prone" to delinquency; but one of these groups put the emphasis on the development of predictive devices and the other on identification through symptoms of emotional distress and behavior. The latter urged that such "labels" as "delinquency prone" and "in danger of becoming delinquent" not be applied to children and youth merely on the basis of prediction scales "prior to antisocial conduct on the part of the child." A workgroup focusing on emotional disturbance in children also became concerned over the possible adverse effects of "labeling" and recommended that law enforcement agencies and courts not affix such labels as "delinquent" to children "prior to competent diagnosis of basic causes."

One Forum speaker, a social worker, pointed out that "far too many who are minor offenders when first they become known to us eventually become hardened criminals despite early identification."[12] What is needed, he said, is a planned community policy providing for case location, case screening, diagnosis, systematic provision of services, diversified resources, integration of services, and coordination of policy and program and of planning.

Another social worker called for a program which would reach out not only to the delinquent, but also to his family and community, "to reincorporate them into the social fabric."[13] Unless work with gangs is complemented by work with the family of the gang member, he said, "the youngster can be caught between the shifting values of the gang and the social values of the home."

Church, schools, recreation agencies, and above all "a good home life" were repeatedly cited throughout the Conference as important in the prevention of delinquency. The need for research into causes and effectiveness of treatment methods was frequently stressed as was the need for training of all kinds of treatment personnel. One recommendation urged the extension of Federal training to include in addition to psychiatrists "the other personnel concerned with prevention, early detection, and treatment of youth in conflict, namely, pediatricians, obstetricians, teachers, ministers, lawyers, welfare workers, probation officers, school social workers, and psychiatrists."

This emphasis on the need for stepped up training of all types of professional personnel emerged throughout the Conference no matter what type of service to children was under discussion. It was also the focus of the entire Forum, called "Human Resources," and its eight related workgroups, where the competition for the educated in this country was plainly regarded as one of the chief blocks to fulfilling promises to children made by this and previous White House Conferences. One speaker predicted: "Unless we devote a larger and better qualified share of the Nation's human resources to the educational, health, and welfare needs of the young, all our soaring hopes and glorious dreams, not only for our children and youth, but also for this country's future, will be frustrated."[14] Repeatedly emphasized was the dependence of the professions on the quality of elementary, high school, and college education—in other words, on the schools' preparation of young people with the ability and desire to go into the service professions.

Suggestions for improving the quality of education included increased financial support from all levels of government; relieving the schools of functions which "properly belong to the home or other agencies"; less emphasis on physical education and sports; employment of teachers on a 12-month basis; special projects for culturally deprived children; increased attention to the gifted as well as slow learners.

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the schools and asked for greater stimulation of the gifted. But at least one educator maintained that such a goal need not conflict with equality of educational opportunities for all children, regardless of their intellectual potentialities. He maintained that persons who "accept the sophistry that equality inevitably means a commitment to mediocrity" overlook "the need for diversity of interest and varied intellectual power and special creativity."[15] Another educator maintained that to charge a school only with the intellectual development of its pupils is both "psychologically impossible and morally irresponsible."[16] He maintained that teachers' and pupils' personalities are bound to interact.

While there were those at the Conference who suggested that child labor laws ought to be reviewed in the light of the delinquency situation, others cited the steady dwindling in unskilled jobs to back the contention that every child in this country needs at least 12 years of schooling. A recommendation that the States require compulsory school attendance until the age of 16 was adopted. The consensus seemed to be that schools should make a greater effort to keep children interested in learning, through revision of program and the provision of more personal counseling and vocational guidance.

Views on curriculum content were various and conflicting, with advocates of sharper attention to vocational training, to science and the humanities, to preparation for family life. A 19-year-old college sophomore said that the average student today "tests everything with the question, 'How can I use what I am learning now when I am out of school?'"[17]

But a theologian took issue with those who regard learning as a means to an end—whether preparation for life or strengthening of national security. Maintaining that "learning *is* life," he called "the modest standards" of contemporary education "unfair to the potentialities of man."[3] Said he: "We prepare the pupil for employment, for holding a job. We do not teach him how to be a person, how to resist conformity, how to grow inwardly, how to say no to his own self. We teach him how to adjust to the public; we do not teach him how to cultivate privacy." Today's major challenge, he said, is "to save man from inner oblivion."

But whether "self-realization" or "social effectiveness," the goal of education was repeatedly presented as a responsibility reaching far beyond the task of the schools. Young people learn "wherever they are," one speaker pointed out, "at home, on the playground, and in Sunday school . . . sprawled before the TV set, sitting in the movies, hanging around street corners, or gathered in Boy and Girl Scout troops . . . from comic books, paperbacks, newspapers, and magazines. . . ." But parents are primarily responsible, she said, for "the kinds of pupils the schools have to work with."[18]

TV, radio, motion pictures, advertising, the press came in for some heavy criticism for not living up to their educational potentials, for incessant portrayals of violence, and for presenting force or greater material possessions as heroic ways of gaining the upper hand.

Points of view differed as to whether these media could have any detrimental effects on a well-loved, well-reared child. A representative of a broadcasting company called for "a Manhattan project to determine the effects of TV on children";[19] but a psychiatrist pointed to the difficulty of designing controlled experiments of this nature.[20]

Others spoke of the values of TV in widening children's horizons and of its uses as teaching aids. There were calls for more parental control over TV watching and some expressions of apprehension about the effects on the younger generation of too much passive recreation. Said one speaker: "TV cannot enter your home without your consent."[21]

FAMILY LIFE

Thus again, as constantly throughout the Conference, the question reverted to the quality of parenthood and of family life. Mothers were called "irresponsible" for going to work outside the home. Fathers were blamed for not spending enough time with their children—or, conversely, for taking over the mother's role. Parents in general were accused of substituting a "phony togetherness" for depth of relationship. The younger people were especially hard on parents, accusing them of not setting good examples, of not being firm, of not allowing enough freedom of choice.

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But parents also had their defenders. A sociologist, for example, denied the existence of a moral decline and said that there is more dedication in the adult world today than ever before to "bringing into the world and bringing up the younger generation,"[13] even though American women are fitting this in with other concerns which are giving them "richer, fuller lives." And a young college student said: "There is a 'me' who I want to be, and it looks like my father and mother."

A few voices, including some young ones, suggested that young people themselves had some responsibility for how they turned out. For example, in one workgroup when a youth representative blamed the "wildness" of a teenage neighbor on the fact that his mother went out to work, a young German visitor said: "I think that by the time a person is a teenager he has a responsibility for the way he behaves and if he knows his mother has to work he ought to be ashamed for becoming wild." And a youth representative from the Deep South volunteered: "My mother has always had to work and when we were children, my father and mother told us why and what we had to do and we did it." And she added: "I think it is helping me to become what I hope to become."[7]

A pediatrician pointed out that the development of responsibility begins early in life in a "reciprocal trust" between parent and child.[22] But a psychiatrist said that the interrelationship of the components of adulthood developed in early childhood "is not finally established until the latter part of adolescence."[23] Guidance agencies, she suggested, should help parents "to understand, tolerate, and remain available" to adolescents going through the "crisis" of sexual development.

A social worker, on the other hand, said that for many youth in disorganized neighborhoods, family conditioning has been completed "for better or for worse" as early as their 14th year. "What these half-grown youngsters now need," he asserted, "is the exertion of a general community influence on the environment around them."[24]

Calls for strengthening parental adequacy suggested a host of approaches. They included the elimination of such social ills as discrimination against minorities, unemployment in depressed areas; poor housing; educational programs such as family-life courses for school children and parent-education classes for adults; the provision of individualized services to parents with special difficulties—parents of mentally or physically handicapped children, parents in one-parent families, and parents too immature in their development to be able to function adequately. Recommendations were made that casework be provided in all public assistance programs and that aid be available to needy but intact families, so that financially distressed fathers will not be tempted to leave home to help their families become eligible for aid to dependent children.

Unmarried mothers of several children usually come from deprived backgrounds and have known punishment all their lives, a social worker pointed out.[25] They need interest and protective authority to keep them out of trouble, she maintained, not more punishment.

"We are guilty of community neglect," said another social worker, when we do not provide the services to help neglectful parents assume responsibility for their children.[26] He said that every community should have a coordinated program of: (1) services for children and their parents living in their own homes—casework counseling, homemaker services, day care services, school social services; (2) services for children who cannot be with their parents—foster family care, institutional care, emergency shelter care; adoptive services; (3) corrective services for children in conflict with the law.

A young man in a workgroup said he knew about "community neglect," because he lived in a housing project: "The agencies seem to move like satellites around the project without ever touching the needs of the people there. But they don't seem to know this."

CHILD HEALTH

The normal processes of child development received considerable attention at the Conference as did the kinds of health services that can help prevent impairment of those processes. Periodic and continuing medical care should be provided for all children, one workgroup concluded, and in its discussions there emerged considerable concern over the quality of care. In a Forum speech a professor of public health referred to

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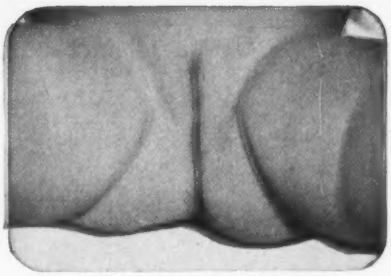

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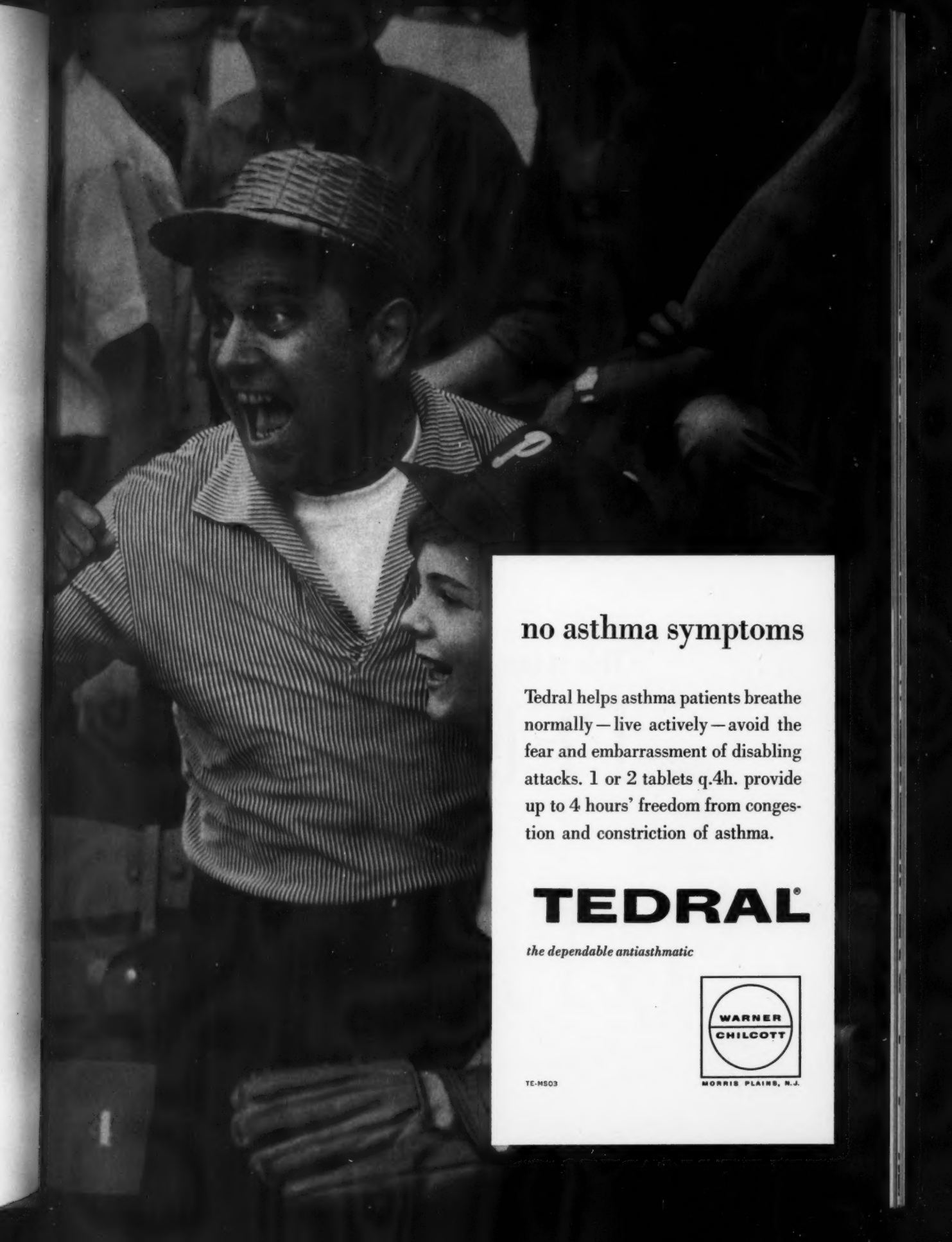

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"our inability to provide adequate health services to certain groups of children"—those who depend on clinics for well child care.[27] Pointing out that 16 percent of infants but only 4 percent of preschool children visit these clinics, he found an indication of why they were considered not "worth the effort of coming" in a study which showed that 34 physicians working in such conferences spent an average of 4 minutes with each child.

This physician and others expressed concern over the rise in the infant mortality rate and the great discrepancies in rates among geographical areas and population groups, which he linked with lack of prenatal care. This concern was carried into at least one workgroup which recommended that a forceful attack be made to lower infant mortality and morbidity rates among American Indians and other minority groups.

New or increasing dangers to public health were also brought to attention—air pollution, water pollution, radiological hazards. Pointing out that "the genetic hazards of radiation pose an ominous threat to the health of the living and unborn generations," a State health officer found it deplorable that only a few States have launched full-scale radiological health programs.[28]

A large portion of the attention to health was riveted on children suffering from handicaps—mental, physical, or emotional. The importance of emotional factors and interpersonal relationships in assisting or impeding treatment and rehabilitation of persons with any type of handicapped condition was especially stressed.

Considerable concern emerged over the growing numbers of children with congenital malformations, and in one workgroup a suggestion for providing eugenic counseling as a possible deterrent was made. This was, however, turned down as a recommendation on the ground that not enough is as yet known about this field.

In another workgroup there was some collision of opinions over whether mentally retarded children should attend special or regular clinics, but the group eventually decided that in view of the chronic nature of mental retardation and the past tendency to neglect these children special clinics are needed, at least now.

Over and over when discussion of the handicapped arose the need to integrate the various types of services throughout the community and to individuals throughout their lives was emphasized as was the importance of providing handicapped children with the basic health services that all children need.

LOOKING BACK AND AHEAD

A look back to 1950[29] reveals both sameness and difference in the concerns that were bothering White House Conference delegates then and in 1960. Certainly not all the pledges to children made by the 1950 delegates had been fulfilled in the ensuing decade.

Many of the hotly debated issues of the memorable all-day voting session of the Midcentury Conference were still subjects of controversy in 1960. The outcomes of two of these—releasing children from public schools during school hours to attend religious classes, and making birth control information available to those who want it—were the reverse of what they were a decade ago, the advocates of each winning recommendations as they did not in 1950. As far as this reporter could find out, there was no controversy in 1960 over nursery school classes in the public schools as there had been a decade ago. On the other hand, some problems receiving only moderate attention in 1950 had been swollen into problems of deep concern by the ensuing course of events—juvenile delinquency; the quality of TV programs; dislocations in family life caused by population movements from north to south, from country to city, from city to suburbia or to a new phenomenon or at least one with a new name, "exurbia."

Perhaps the problem over which concern had been most notably broadened and deepened by the sweep of historical events was racial desegregation. At the 1950 Conference one of the most bitterly fought battles occurred over a repeatedly defeated attempt by youth delegates to get through a recommendation that no similar conference ever again be held in the Nation's Capital so long as its hotel and eating facilities were barred to the Negro participants. In 1960 this battle was no longer necessary since the 10 intervening years had brought striking changes to the city of Washington,

and the hotels and restaurants were generally open to everyone.

In 1950 a recommendation endorsing President Truman's civil rights program was hardly won. But in 1960 the temper of the Conference for eliminating racial discrimination from American life (North and South) met with little opposition and resulted in scores of specific recommendations concerned with schools, housing, employment, and other opportunities.

Anything involving 7,600 freely talking people is bound to provoke some criticisms. Some professional persons reported feeling frustrated in workgroups where the IBM homogenization of participants sometimes meant no common level of understanding of the subject under discussion. Some young persons said they could not communicate with adults, and some adults said the reverse. But an abundance of communication obviously took place to produce the 1,600 recommendations that poured from the workgroups. One critic predicted that the Conference's size and diffuseness of focus would prevent results "proportionate to the investment and sacrificial effort of so many people."[20] He and others talked of "too much talk." However, the chairman of the President's National Committee pointed out at the closing meeting that "talk is preliminary to action."

Already a structure and procedures are being worked out for helping States to stimulate the kind of widespread participation in followup that went into preparing for the Conference. Since each participating State and national organization has already done some self-study in preparation for the Conference, their reports may be regarded at least as preliminary maps for proceeding. But some States will undoubtedly do some renewed reconnaissance and remapping in the light of the Conference's recommendations.

In the closing address of the Conference, Arthur S. Flemming, Secretary of Health, Education, and Welfare, commended the participants for taking a strong stand against discrimination based on race, color, or creed; for calling attention to some vital needs in the fields of education, service to the mentally and physically handicapped, control of juvenile delinquency, and public assistance; for pointing to the serious nature of manpower shortages in the service fields and to their need for research; and for underlining the importance of a personal religious faith.

Agreeing that greater financial support is needed for education, the Secretary said he believed that the "time has come to obtain agreement on what should be our investment in education as a Nation" and as to "what constitutes a fair share of responsibility" for meeting this on the part of government "at all levels" and private contributors. He also said that the Federal Government must become a "more effective partner" in determining the causes of juvenile delinquency and demonstrating ways of dealing with it.

The Secretary urged the delegates to go back to their communities determined to demonstrate "that we do believe that man has an obligation to help his neighbor realize his highest potential."

What will come of it all?

Participants are not sure. But many of them no doubt feel somewhat the way one youth participant was feeling when a newspaper reporter[21] asked him "What good is it going to do?" Said the boy:

"I will tell you this. I came here interested in my particular subject . . . I think I'd have to say that I probably wasn't as tolerant or understanding as I am now . . . I think it's helped me, and, I hope, others. We all hope, I guess, that when we go back home we'll be able to take what was done here and bring about the changes that are necessary.

"Whether that will happen or not, well, we'll have to wait and see."

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5. Abraham J. Heschel, Professor of Jewish Ethics and Mysticism, Jewish Theological Seminary of America.
6. Rev. Philip Potter, Executive Secretary of the Youth Department, World Council of Churches, Geneva.
7. Charles A. Janeway, M.D., Department of Pediatrics, Harvard Medical School.
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17. Karen Sanchez, student, Wellesley College.
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20. Leo H. Bartemeier, M.D., Medical Director, Seton Psychiatric Institute, Baltimore.
21. Chester D. Babcock, Executive Director of Instruction and Curriculum Research, Seattle Public Schools.
22. Preston A. McLendon, M.D., Professor of Pediatrics, George Washington University.
23. Irene M. Josselyn, M.D., Institute for Psychoanalysis, Chicago.
24. Lester B. Granger, Executive Director, National Urban League.
25. Leontine Young, Professor of Social Administration, School of Social Administration, Ohio State University.
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The challenge of disability*

Surgeon General Leroy E. Burney†

The challenge of disability confronts every physician, whether he is a general practitioner or specialist, in private practice, in medical education, in public health, or in public medical care. It confronts members of all the health professions, as well as public and private welfare agencies. It confronts governments at every level, as well as legislatures.

The burden of disability falls with greatest severity upon disabled individuals, of course, and upon their families. But it affects every citizen, whether as employer, taxpayer, or community leader.

How does our society view disability? There is no doubt that in the United States disability is viewed with compassion, and as a burden which all of us must share with the disabled. Our programs to alleviate the financial burdens of disability and our rehabilitation programs for crippled children and disabled adults are the best evidence of our concern.

But I want to delve deeper into our attitude toward disability. I have observed wide variations in the kinds of services offered to disabled individuals in different countries. The underlying attitude, however, is very much the same. Disability is viewed by all societies as an accomplished fact; an unavoidable burden to be accepted—as our forefathers accepted all disease—as an act of fate or of some malevolent demon.

To be sure, in countries like our own with highly developed medical skills and ample economic resources, there is a strong effort to alleviate disability. But in America and elsewhere we tend to apply the remedy after the fact—usually too long after. We have yet to develop an attitude which views disability as preventable.

If public health has a particular contribution to make in the field of rehabilitation, I believe that it is to foster an attitude of prevention. Prevention has been the first principle of public health since the birth of the modern movement. The earliest focus of attention, of course, was the prevention and control of infectious diseases. Over the years preventive measures applied by public health agencies and private physicians have averted an inestimable amount of prolonged disability, simply by the control of infections which left many survivors with crippling aftereffects. Many physicians in this audience will recall the frequent heart damage due to diphtheria, syphilis, and rheumatic fever. Most recently, the

*Reprinted from *Public Health Reports*, April 1960.

†Dr. Burney, Surgeon General of the Public Health Service, delivered this address at the Governor's Institute on Rehabilitation, Honolulu, Hawaii, January 11, 1960.

prevention of paralytic poliomyelitis, through the use of an effective vaccine, is rapidly reducing the accumulation of severely disabled persons due to that cause.

Today, the public health profession as a whole is as much concerned with high disability rates due to chronic conditions as it was with high mortality rates due to diphtheria and typhoid fever 60 years ago. The objective of this concern is to prevent the occurrence of chronic diseases, accidents, and dangerous environmental exposures if possible; if not, to prevent their disabling consequences.

Our Federal-State programs of public health and rehabilitation have one common objective; namely, reduction of the social and economic consequences of disability. Yet there are differences in approach. Public health strikes primarily at the causes of disability and hence must seek its opportunities for prevention among supposedly healthy individuals and in the community environment. Rehabilitation strikes primarily at the effects of disability and must seek its opportunities among individuals who are known to be disabled. Both programs are constructive at the core, in that both seek change for the better: change in health status for the whole community, change in the disabled status of the individual.

This determined effort to bring about change is a dynamic force in public health and rehabilitation. It is the force, I believe, which has brought the Public Health Service and the Office of Vocational Rehabilitation into a closer relationship during the past year. We realize more than ever before that our country cannot solve the medical and community service problems involved in disability by piecemeal approaches. Hence we are striving to plan and work together, so that the Service and OVR may more effectively mobilize their resources in a concerted attack on the causes and on the effects of disability.

Disability is a medical problem first and foremost. The success of the attack, therefore, depends primarily upon the alertness and action of each physician. As a social problem, disability can be alleviated by financial support of the disabled, by social services, vocational counseling and training, and placement in employment. It cannot be solved by these means, however, unless everything possible has been done to solve the medical problem.

The preventive approach to disability views the medical solution as beginning the moment a physician sees a patient whose condition obviously or potentially will lead to disability. The medical solution of disability continues as long as the patient needs medical services to sustain his highest potential of active life. This is the central fact which demands a broader view of rehabilitation than has been generally accepted in this country up to the present time. And it is the fact which demands the development of community medical services and the active participation of all physicians.

Rehabilitation services too often are planned around the problems of patients with static conditions—the paralytic, the amputee, the blind. Our Federal and State laws related to employee compensation, social insurance, public assistance, and vocational rehabilitation tend to support this view of rehabilitation.

Another handicap to the medical solution of disability is the emphasis on the potential for competitive employment in public and some private rehabilitation programs. This criterion does not take into account the needs of elderly retired persons for rehabilitation services, nor of many severely disabled younger persons who, for one reason or another, do not present a significant potential for employment.

CHANGES IN COMMUNITY NEEDS AND SERVICES

The greater efficiency of medicine today warrants a much more flexible response to the challenge of disability. I should like to discuss with you briefly a few of the changes in recent years which focus attention on the role of medicine and public health in rehabilitation.

I need not summon an array of statistics to demonstrate the changes in the patterns of illness. Acute conditions, excluding injuries, account for smaller proportions of the Nation's mortality and

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prolonged disability. Chronic conditions and severe impairments are the major health problems. There are more older people in the population, and the incidence of chronic conditions increases with age.

Of equal significance, a larger proportion of acutely ill persons survives the initial attack or the injury which first brought them to the physician's attention. Delay in the institution of restorative medical services until the patient's condition has stabilized often means waiting until he has become "permanently and totally disabled."

The initial heart attack, for example, proves with increasing frequency to be the first episode of many. If the physician does not have in mind the prevention of disability from the outset, he may add another "heart-cripple" to the increasing number of cardiac patients who are needlessly retired from active life by reason of their disease. Early return to an increasingly active regimen under careful medical supervision will avert many such cases.

There are untold numbers of stroke patients surviving today in a tragic sort of half-life. By very simple measures instituted promptly in the home or in the hospital, the majority of stroke patients can recover function within a short period of time. There is ample clinical evidence that more than 80 percent of patients who survive a stroke can become ambulant within two months with appropriate clinical management. The longer the physician waits to institute these measures the longer will the patient be disabled, and the more difficult it will be to restore function.

As the Nation's families and communities struggle with mounting burdens of long-term disability and dependency, are there no alternatives to high-cost care in hospitals and institutions? Fortunately, some States and communities have experimented and found that much disability can be prevented, and that many long-term patients can be cared for in their own homes, often more satisfactorily than in an institution.

The Georgia State Health Department, for example, in cooperation with the State Heart Association, medical organizations, and the Public Health Service is conducting a special program for stroke patients. There are approximately 40,000 survivors of strokes in the State. Often these patients have other serious medical problems and fill hospital beds over long periods of time. Prolonged bed rest, dependency, and speech difficulties generate severe disability, as well as psychological problems in these patients. Their disability creates social and economic difficulties for their families.

The Georgia stroke program includes education of the medical and nursing professions in the early use of physical therapy and early ambulation of stroke patients. A demonstration clinic is being conducted at Grady Memorial Hospital, the teaching hospital of Emory University Medical School. Here the stroke patients are seen on an outpatient basis and appropriate physical therapy is prescribed. The family is responsible for carrying out the therapy in the home. A public health nurse visits the home periodically to instruct the family and to supervise performance of the recommended procedures. A team composed of a physician, a physical therapist, and a public health nurse is available to give intensive training in these procedures to physicians and nurses in local communities.

Another program, even broader in concept than that of the Georgia stroke program, is of interest. This is a home care program for disabled persons conducted in a rural county in North Carolina. It provides medical consultation, nursing, social service, physical and occupational therapy, health and nutrition education, orthopedic equipment, medicines, and sickroom supplies as needed. Residents of the county are eligible regardless of age, sex, or financial status, providing they possess a potential for self-care or self-support. All patients must be referred by a local physician and must remain under his care while receiving services of the program. The Public Health Service is cooperating with State and local agencies in this project.

A specially significant feature of this program, I believe, is its community wide coverage. So long as community services are restricted to persons dependent on public welfare or to individuals with a potential for employment, medicine and public health will be neglecting the majority of the people needing care. In most rural areas, services such as are provided by this program have to be

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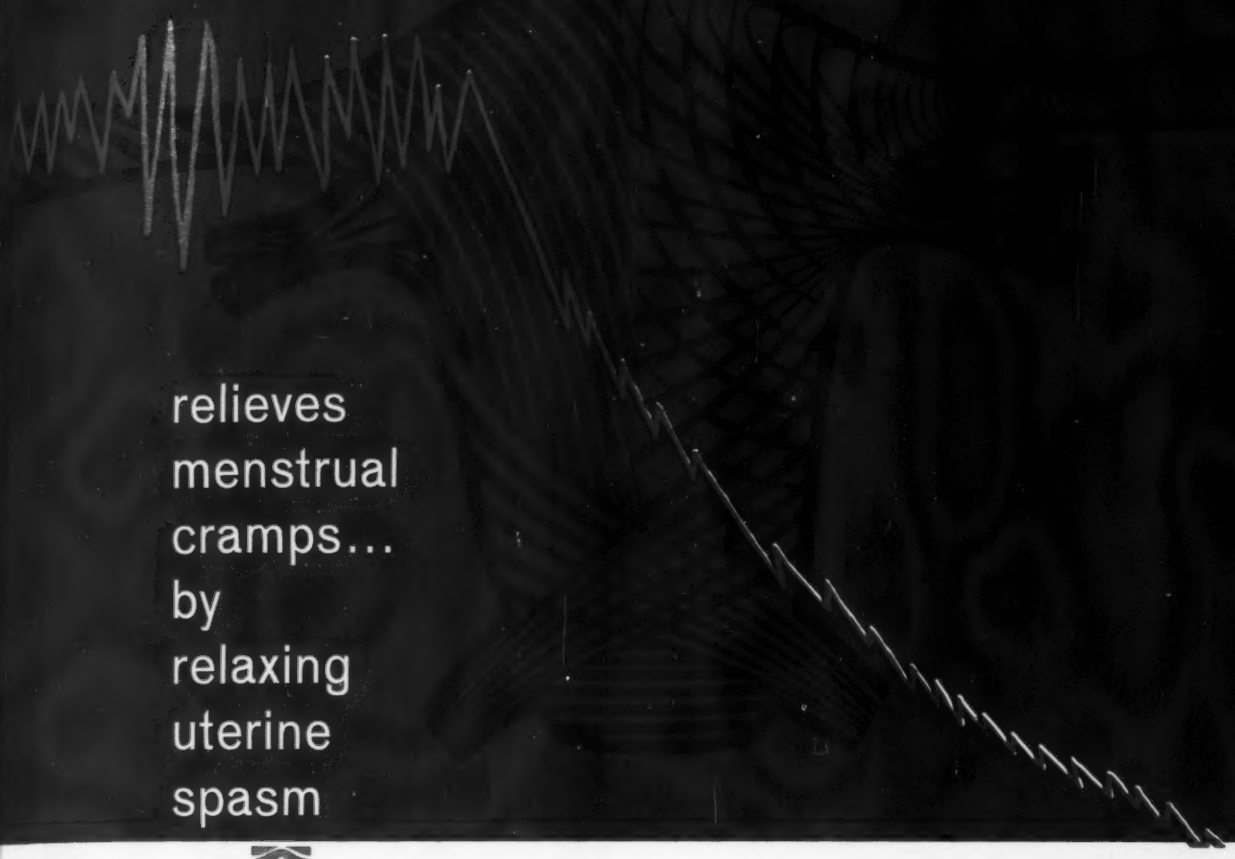

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References: (1) Voulgaris, D. M.: Dysmenorrhea: Cramps or Psyche?, Scientific Exhibit, 108th Ann. Meet., Atlantic City, June 8-12, 1959. (2) Detailed reports in Mead Johnson research files. (3) Voulgaris, D. M.: Obst. & Gynec. *15*: 220-222 (Feb.) 1960.

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created. They are not available outside the hospital and many rural hospitals do not have the full range of services required for medical rehabilitation.

I have been told that the first patient to apply for the services of this home care program was a disabled woman whose financial resources are ample to support her for the rest of her life. She wanted to live in her own home rather than in some distant institution. Her inner drive for an active life sought the means for recovery. Her physician could not possibly provide all the services and facilities she needed to achieve this goal. Yet before the community home care program was established, there was no way he could bring the nursing service and special therapies to her bedside.

A few years ago, the Commission on Chronic Illness listed 32 services which patients with long-term conditions are likely to need at various times. While the average physician has his patient in the hospital, most of these services, plus the basic provision of bed and board, are made available as a matter of course. He takes such services for granted, scarcely realizing that nowhere else in the community will his medical decisions be so scrupulously put into practice. The physician is responsible for making the diagnosis and prescribing the treatment, but an army of professional and ancillary personnel carry out his orders—in the hospital.

These so-called "supplementary services," and the men and women who render them, now play a more important role in the delivery of medical services than the physician himself. In 1900, three in every five professional health workers were physicians; in 1950, only one in five were physicians. The problem that confronts the physician, as keyman in combating disability, is how to marshal these supplementary services in effective management of his patients—in his office and in their homes.

Public health, with its community-oriented approach, is in a strategic position to help resolve this dilemma of modern medical care. Chronic disease, mental disorders, and the problems of aging may be regarded as the "growing edge" of both prevention and rehabilitation. The benefits from application of the wealth of knowledge in both fields are still largely potential. They will remain largely potential, I fear, until all physicians—in private practice, in administrative positions, and in hospitals—recognize and act upon their responsibilities in these fields. I place this burden on our entire profession for the simple reason that these are medical problems, and the action of other groups in health related services stems from the physician's initiative.

What nurse, for example, will begin the measures which will restore function in a stroke patient—unless the attending physician has specifically prescribed these measures? What personnel manager or supervisor will properly adjust the cardiac patient's work schedule—unless the physician has clearly prescribed the patient's 24-hour schedule of working and living activities? What local health department will allocate its often meager resources to home services for the disabled—unless the medical society endorses such programs, and practicing physicians use the services?

I have tried to present to you herewith some of the changes that are affecting medicine, public health, and rehabilitation. I have shared with you some thoughts on the challenge of disability and how we may meet it with greater confidence. It will not be easy to stimulate a fresh view of disability as a preventable evil. Even with the great scientific advances, the medical solution of disability will not be easy. It is up to us to try.

A first step is for men and women in the fields of medicine, public health, and rehabilitation to get to know each other better. Better understanding of one another's aims, methods, needs, resources, and problems; better communication—these will lead us into better ways of working together for the goals we all want to attain.

Let us also work together for the patient in his community. This means that we must work toward better organization of community services, better balance in our programs, earlier application of preventive methods in the care of all patients. We must do so if our material resources, with a shrinking dollar and a shrinking supply of competent personnel, are to suffice in making a significant impact on disability.

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Fat consumption in the United States*

Frederick H. Epstein, M.D.†

Vital statistics show wide variation in arteriosclerotic heart disease mortality among different States of the Union.[1] Such variations, if real, might be related to differences in dietary habits, particularly with regard to fat consumption. The U.S. Department of Agriculture has published extensive tables on food consumption based on household interviews conducted in the spring of 1955, which permitted testing for differences among the four major regions of the Union (North East, North Central, South and West), between urban and rural areas, and between income groups.[2] Variations in the quantity or types of food consumed among the population segments thus defined would be of help in identifying groups suitable for more detailed epidemiological studies of the relation between nutrition and cardiovascular disease.

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†Dr. Epstein is associate professor of epidemiology, School of Public Health, University of Michigan. This study was supported by a grant from the National Heart Institute, Public Health Service.

This analysis of the U.S. Department of Agriculture data searches for such variations. It was realized, however, that the original survey was intended to serve a quite different purpose, that is, to collect information "for administration of public programs affecting food supply, distribution and consumption; for educational programs to improve food habits, and for private efforts to broaden and improve the marketing of foods."[2,3] Data collected for one purpose do not necessarily lend themselves to analysis for another. Yet this study seemed justified in view of the paucity of detailed information on the food habits of subgroups of the general population in the United States and their possible relation to disease patterns, particularly atherosclerosis.

Several publications of the U.S. Department of Agriculture have summarized part of the information culled for the survey.[4,7] In particular, the average fat consumption in the four major regions, North East, North Central, West, and South, was analyzed in terms of saturated and unsaturated fatty acid content but no breakdowns by degree of urbanization and income were made.[5,7] Our data present a systematic and simultaneous analysis of almost all relevant fat-containing food items in the diet by region, by degree of urbanization, and by income group. Moreover, the data given in the tables published by the U.S. Department of Agriculture refer to average household rather than per capita consumption, regardless of the fact that certain food items are eaten only by a proportion of the population. In this analysis, data are presented for per capita consumption among users only.

Our findings suggest that major overall dietary habits of fat consumption vary remarkably little among different broad segments of the general population within the United States, a significant observation from the point of view of epidemiological research into the causes of atherosclerotic diseases.

METHODS OF ANALYSIS

The tables on "Dietary Levels of Households" were used for the determination of total calorie, fat, and protein consumption.[3] Individual food items were analyzed, using the tables on "Food Consumption of Households."[3] These tables provide data on average consumption in households and also the average number of persons per household in different regions and groups. Thus by dividing household consumption by household size, per capita food consumption of the total segment of the population

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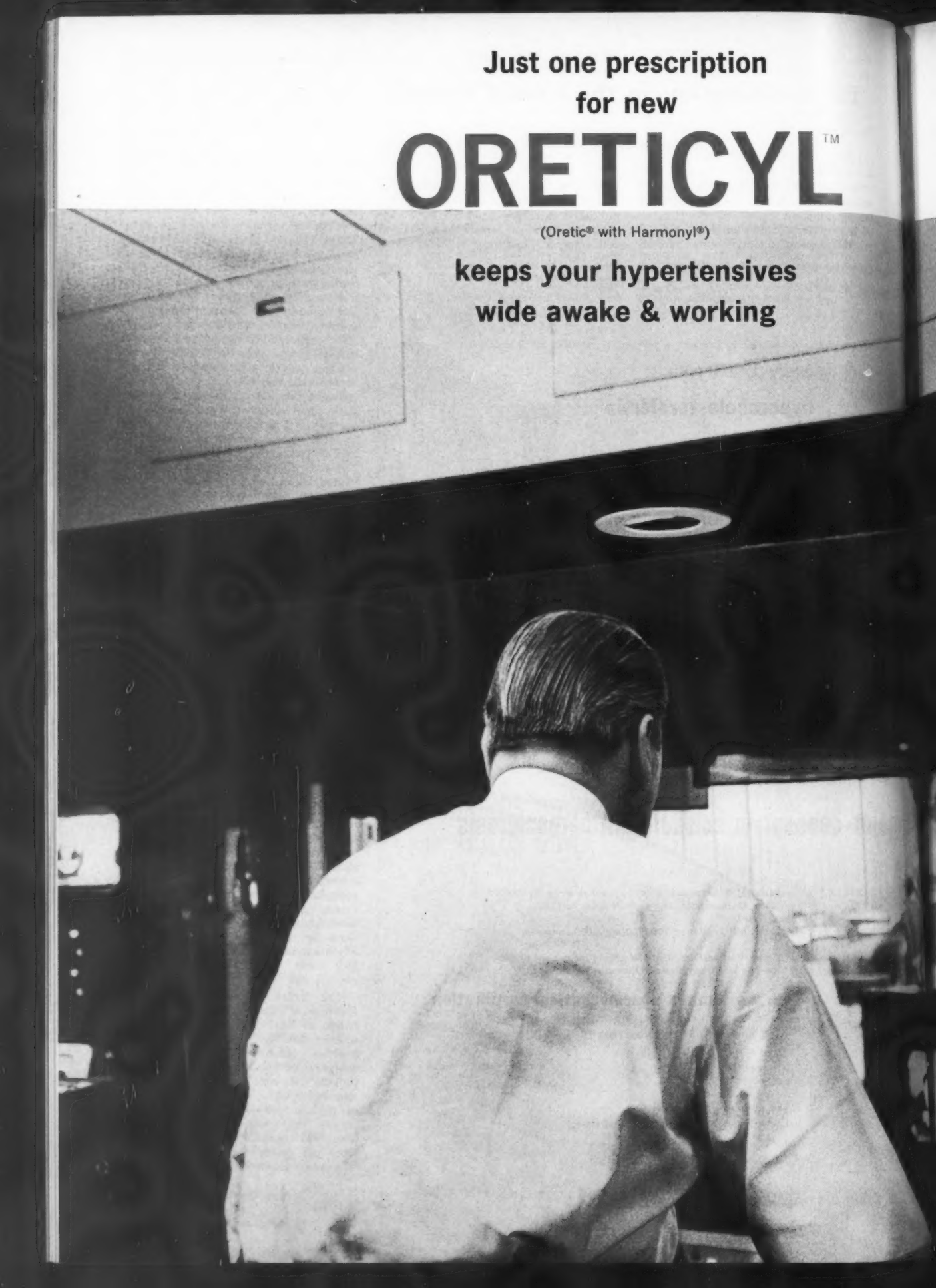
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2. Winsor, T., Comparative Effects of Various Rauwolfia Alkaloids in Hypertension, Diseases of the Chest April, 1959.

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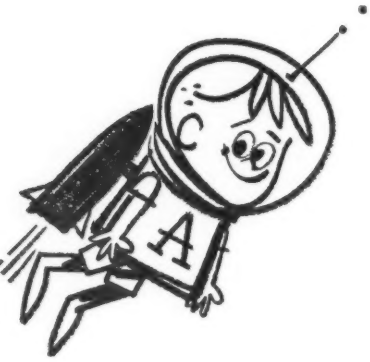

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under consideration may be calculated.

A further correction is required for calculating consumption among those actually using the food item in question. This can be accomplished by dividing the average per capita consumption by the percentage of "users." An error may be introduced by this method since it tacitly assumes that household size is the same among users and non-users, not necessarily a correct assumption. Thus, in Great Britain at least, it has been shown that the number of children in a family, a decisive factor in household size, is more critical than social status in determining food habits.[8] In defense of using the correction in question, it may be said that the average household size in the four different areas of comparable urban and rural localities is generally so similar (3 to 4 persons per household) that the assumption of comparable household size among users and non-users may produce no more or possibly even less error than the uncertainties inherent in gathering the basic dietary information, or the inevitable failure to adjust for the varying ages among the household members.

The basic data refer to food consumed rather than food purchased. Nevertheless, there is likely to be some overestimate of intake because of "food waste," a quantity notoriously difficult to gauge. Uncertainty regarding food waste is particularly troublesome in estimating fat intake.

Eighty-eight charts have been prepared. Twelve of these depict the intake of calories, protein, and fat in the four major regions. The remaining 76 charts pertain to household and per capita consumption of 19 different fat-containing food items. Each chart represents one of the four regions. Each of the 88 charts includes breakdowns into the three degrees of urbanization, urban, rural nonfarm, and rural, and, within these, different income groups.

CALORIES, PROTEIN, AND FAT

The large number of charts precluded publication in their entirety. Brief, descriptive annotations of the charts are obtainable from the author upon request.

Average total caloric intake tends to be somewhat lower in the urban and rural nonfarm areas of the North East than in the comparable areas of the three other main regions of the country. There is a general tendency for caloric intake to increase, moving from town to country; intake in the farm areas is uniformly highest, including the North East. There is no discernible association between caloric intake and income level, except for a slight positive correlation in the urban North East and in the urban and rural nonfarm areas of the South and West.

Average protein intake seems to be no different by region or area, except for a somewhat lower intake in urban and rural nonfarm areas of the South. In the same areas in the South and the West, the protein intake tends to rise with income; a less definite but suggestive correlation with income is noted in the two urban areas of the North.

The trends for total fat and protein consumption are similar except that farm consumption usually tends to be higher than urban and rural nonfarm consumption. As in the case of protein, fat intake tends to rise with income in the urban and rural nonfarm areas in the South and West, income group 1 denoting the lowest and income group 8 the highest level. It is difficult to decide from inspection of graphs whether any of the less obvious differences between income groups are significant statistically or nutritionally, taking into account the variations inherent in the method of data collection.

In summary, there is a considerable degree of uniformity in average caloric, protein, and fat intake, irrespective of region (North East, North Central, South, or West) or area (urban, rural nonfarm, and farm). However, caloric intake tends to be lower in the two more urban areas in the North East, and there is a distinct tendency for all three variants to show a positive correlation with income in the two more urban areas in the South and West and possibly in the other two regions as well.

FATS AND OILS

The "total fats and oils" category includes butter, margarine, shortenings, salad dressings, and salad and cooking oils. Household fat consumption increases with diminishing degrees of urbanization in all four regions. This trend, as well as the higher consumption in the South, reflects household size.

Since differences in average household consumption tend to reflect differences

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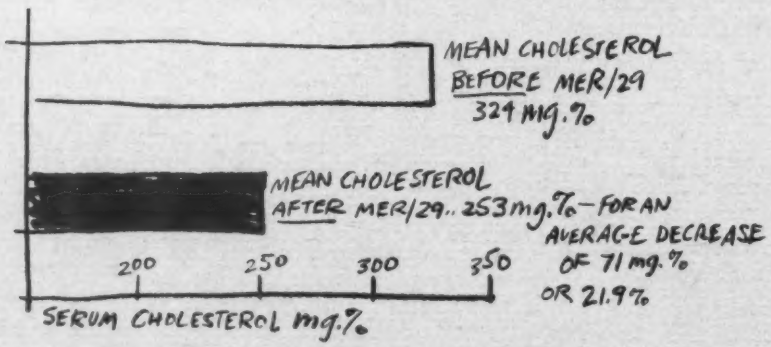
High cholesterol levels are generally considered those above 250 mg.%. Here is a tabular summary of preliminary data on MER/29 therapy in 463 patients with hypercholesterolemia (over 250 mg.%).


MEAN CHOLESTEROL BEFORE MER/29 324 mg.%
MEAN CHOLESTEROL AFTER MER/29.. 253 mg.% — FOR AN AVERAGE DECREASE OF 71 mg.% OR 21.9%
200
250
300
350
SERUM CHOLESTEROL mg.%

Clinical studies show that cholesterol reduction usually begins within two weeks. Maximum effect is achieved in five to eight weeks, and is usually maintained as long as therapy is continued. The studies of Hollander, Chobanian and Wilkins and those of Oaks, Lisan and Moyer showed that cholesterol levels were lowered by MER/29 therapy, irrespective of diet.

Reduction of total body "miscible pool" of cholesterol has been confirmed by radioisotope studies. Hollander and Chobanian, for example, found that the apparent miscible pool of cholesterol was reduced from 184 Gm. in the control period to 100 Gm. during MER/29 administration.

Studies in animals on MER/29 have shown the following tissue changes: erythrocyte cholesterol levels reduced 40%; plasma cholesterol reduced 62%; liver reduced 40%; skeletal muscle reduced 27%; lung reduced 33%; aorta reduced 21%. Significantly, brain and adipose tissue remained unaffected during the period of observation.

Safety and toxicity studies[5, 7, 10, 12, 17, 19, 21-24, 30, 32-34]

MER/29 is well tolerated. In a recent analysis of 576 individual case reports, 165 had been treated with MER/29 for continuous periods in excess of a year. A number had received two to four times the daily recommended dose for as long as 14 months. Side effects were seldom seen, and the incidence of those reported (nausea, dermatitis) usually was correlated with dosages greater than those now recommended.

In no case has there been clinical indication of toxic effects on the function of any vital organ or system. It should be noted that excretion of MER/29 or its metabolites may produce a false positive reaction for albuminuria.

THE FACTS ABOUT MER/29

Clinical observations of MER/29 in atherosclerosis[5, 7, 10, 12, 17-19, 21, 23-25, 28-34, 41]

The lowering of high cholesterol levels is regarded by many as a desirable clinical objective. Moreover, a substantial body of medical opinion implicates elevated cholesterol as a contributor to coronary artery disease and generalized atherosclerosis. Since MER/29 lowers total body cholesterol, can it modify atherosclerotic conditions? While the ultimate answer must await the results of long-term clinical experience, preliminary observations were reported at...

The MER/29 Conference at Princeton

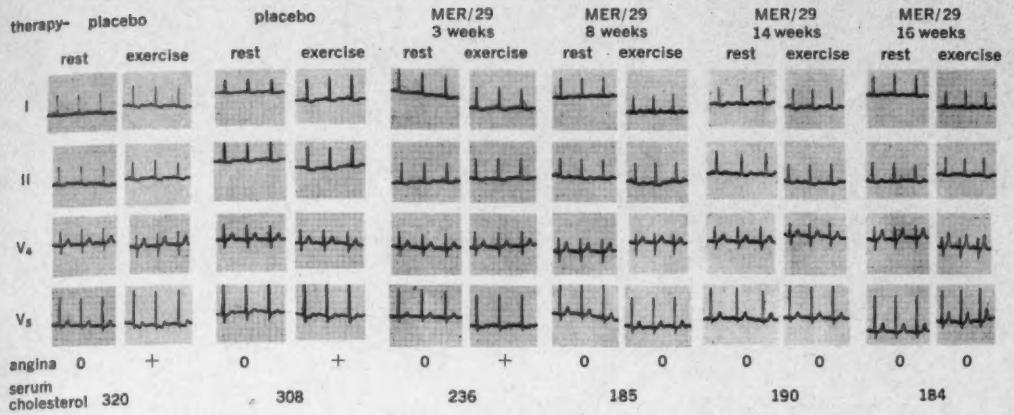
To help find the answer, 18 leading research teams met to discuss the relationship of MER/29 to cholesterol metabolism and atherosclerosis. The conference, moderated by Dr. Irving S. Wright, and summarized by Dr. Konrad E. Bloch, Dr. Robert W. Wilkins, and Dr. Irvine H. Page, was held last December at Princeton, New Jersey.

(The complete transcript of this conference is published as a supplement to the May, 1960, issue of Progress in Cardiovascular Diseases.)

Objective findings

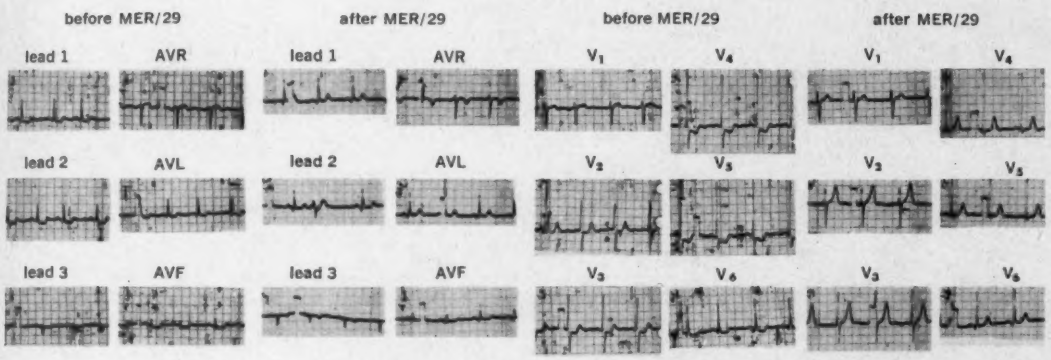
The team of Dr. William Hollander, Dr. Aram V. Chobanian, and Dr. Robert W. Wilkins at Massachusetts Memorial Hospitals presented Fig. 1. It indicates a reversal of exercise-precipitated ECG abnormalities in a patient with angina pectoris during four months of MER/29 therapy. In all, they reported that three of nine patients showed reversal of exercise-induced ECG abnormalities after three months of MER/29 therapy.

Figure 1


therapy- placebo
placebo
MER/29 3 weeks
MER/29 8 weeks
MER/29 14 weeks
MER/29 16 weeks
rest exercise rest exercise rest exercise rest exercise rest exercise rest exercise
I
II
V4
V5
angina 0 + 0 + 0 + 0 0 0 0 0 0
serum cholesterol 320 308 236 185 190 184

Dr. Philip Lisan of Dr. John H. Moyer's group at Hahnemann Hospital presented Fig. 2. It also indicates reversal of ECG abnormalities in a patient with angina pectoris.

Figure 2



Dr. A. C. Corcoran of St. Vincent Charity Hospital, Cleveland, and Dr. Arthur Ruskin of University of Texas reported similar objective findings. Many of these investigators noted that patients offered subjective evidence that they were experiencing a feeling of better health on MER/29 therapy, and that nitroglycerine dependence was diminishing.

Negative data were presented by Dr. Henry I. Russek of Staten Island, N. Y. He reported a study of exercise-electrocardiographic tests in 14 selected

subjects on MER/29. None of these patients had shown more than transient improvement in exercise tolerance after 3 months of treatment. It should perhaps be noted that this group of angina pectoris patients was a select group, having complained of symptoms for long periods of time.

Subjective findings

Dr. Meyer H. Halperin of Lynn, Massachusetts, reported a series of 18 patients with angina pectoris. Nine of this group obtained unequivocal subjective relief of symptoms after various periods of therapy with MER/29. An analysis of the duration of symptomatology in these patients indicated that response occurred more frequently when the ischemic heart disease had been present for shorter periods. Specifically, those who responded had had the condition for an average of 2.9 years, while the average time for those who did not respond was 5.2 years.

This study suggests that improvement in angina pectoris, when it occurs, may best be expected in those patients in whom the symptoms have been present for shorter periods of time. Additional experience will be required to determine whether long-term therapy can reverse long-standing symptomatology.

Dr. William B. Kountz of the Washington University School of Medicine, St. Louis, reported a group of 79 patients with varying degrees of hypertension, angina pectoris, diabetes, atherosclerosis or myocardial infarction. "Clinical improvement was observed and was also reported to us by patients. In some instances the anginal pain improved very much."

Similar subjective findings were also reported by

Dr. Corcoran, eight of whose nine patients noted a feeling of better health, while five demonstrated electrocardiographic improvement on MER/29. In three of these patients, nitroglycerine requirements were dramatically reduced.

IN SUMMARY ... MER/29 does consistently lower total body cholesterol by inhibition of endogenous cholesterol formation. Some patients with coronary artery disease, while on MER/29, have experienced concurrent clinical benefits such as reduction in frequency and severity of anginal attacks, reduction in nitroglycerine dependence, reversal of ECG abnormalities both at rest and following exercise-induced changes, and a sense of improved health and well-being.

The explanation of these clinical benefits is as yet unknown; however, several hypotheses have been advanced. One group speculates that MER/29 "may actually improve the adequacy of coronary circulation." Another investigator suggests that MER/29 exerts a vasodilating action, though pharmacologically MER/29 produces only transient vasodilating effects. Whatever the explanation, observation of these benefits among certain patients has awakened mounting interest in MER/29 as an important new agent in the management of patients with hypercholesterolemia and atherosclerosis.

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Hypercholesterolemia and its associated conditions may require MER/29 therapy over a long period. MER/29 has been shown to be entirely safe in the periods the drug has been studied, but long-term or lifetime effects are unknown. Periodic examination of patients on long-term MER/29 therapy is therefore necessary. While clinical liver damage has not been encountered, periodic liver function tests may be desirable until more long-term safety data are available.

Note: The specific site of action of MER/29 is now known to be between desmosterol (reported to be the last precursor in the synthesis path) and cholesterol. Although greater than normal quantities of desmosterol can be qualitatively shown in the livers and blood of animals and the blood of human beings treated with MER/29, reduction of total sterols suggests little, if any, accumulation. The significance of the presence of this substance is unknown and speculative.

Compatibility with other cardiovascular therapies: MER/29 is not to be considered a substitute for measures ordinarily employed to control anxiety, hypertension, obesity, and other conditions associated with cardiovascular disorders. However, MER/29 is compatible with measures used in these disorders, including anticoagulants, nitroglycerine, and PETN.

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in household size rather than true differences in consumption between groups, only per capita consumption will be discussed. Household data may be obtained from the detailed tabulations. Per capita consumption of fats and oils is strikingly similar in all regions and within comparable areas and income groups, except for a somewhat lower level in the urban North East, where total caloric and total fat consumption are also lower. In each region, except in the West, consumption per person is lowest in the urban and highest in the rural areas.

Baked products, not being primarily fat-containing, have been excluded from this analysis. While the consumption of baked products and prepared foods is known to be higher in urban than rural areas,[6] it is unlikely that their inclusion would have materially altered the general picture of fat consumption. Baked goods form but a part of the category of "grain products," a group which, even as a whole, accounts for no more than 5 to 7 percent of the calories derived from fat in the different regions and areas.[3] It is not implied that baked products are an unimportant source of fat or calories for some people or groups.

It is clear that the total consumption of separated fats is high, regardless of region, degree of urbanization, and income. The types of separated fats contributing to this total picture might be suspected to differ appreciably among the various population groups, but further analysis gives little support to this hypothesis. When the consumption levels of butter, margarine, shortenings (lard and nonlard), salad dressings, and salad and cooking oils are charted individually, no striking differences among regions, areas, or income levels emerge. Moreover, since the proportion of users of these various types of separated fats is reasonably similar from one region, area, or income level to the next, these observations rule out major intergroup differences in the food patterns under discussion. Yet some differences must exist since we must assume that the non-users of one particular type of fat substitute another, for example, vegetable shortening for lard, if we are to account for the similarity in total fat and oil consumption among different subgroups. The basic tabulations do not provide the breakdowns necessary for such an analysis, which was beyond the scope of the original purposes of the survey as explained. Nevertheless, significant group variations in this regard may well exist. Thus, although relatively few households use salad and cooking oils, consumption tends to be high among those who do, presumably at the expense of the more saturated forms of fat.

DAIRY PRODUCTS

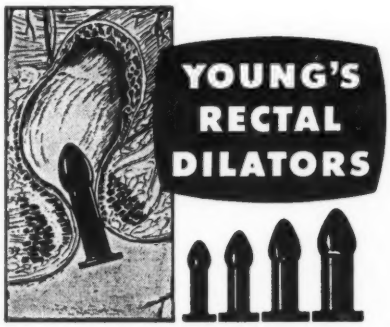
Detailed tabulations have been made for milk (fresh fluid and evaporated), cream, ice cream and ice milk, cheese, and eggs. In general, the findings are similar to those for separated fats. Little variation in consumption level has been encountered among the users in the different regions, areas, and income groups. Likewise, for each given dairy product, the percentage of users tends to be comparable from one population subgroup to the next. Rural areas in general and the South are exceptions. Consumption is higher in farm districts and lower in the southern States. Within the dairy products group, there is less room for substitutions than in the "fats and oils" category and there is even firmer ground for stating that there are no major intergroup differences in consumption.

MEAT, POULTRY, AND FISH

As in the case of fats and oils and dairy products, the economic leveling process has tended to equalize differences in meat, poultry, and fish consumption. Exceptions are a lower meat consumption in the South, at all degrees of urbanization, and a slight positive association between meat consumption and income. Also, the proportion of households using fish is higher in the North East. The present findings are not in accord with the statement that meat is of lesser importance in rural diets.[5] The data in support of this claim are based on the total category of "meat, poultry, and fish" and, not being expressed as per capita consumption of users, can be explained by the fact that the proportion of users of poultry and fish is higher in urban than rural areas.

COMMENTS AND RECOMMENDATIONS

It would seem permissible to conclude from these data that selected income



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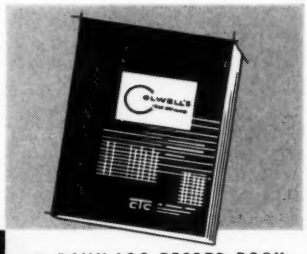

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groups in certain regions and areas of the United States do not appear to offer themselves as units for more detailed study of the relationship between fat intake and coronary heart disease. Yet, it is likely that there are more narrowly defined cultural and religious subgroups within the United States differing sufficiently in dietary habits to permit a study of the relationships between diet and disease in this country which might be more easily interpreted than certain international comparisons.

There is also a need for concurrent clinical and dietary studies among populations or representative population samples, using methods of dietary history taking of adequate validity and reliability, in order to delineate differences in dietary habits between individuals within the same group rather than searching for differences between groups. In this light, the original interview records collected in the survey by the U.S. Department of Agriculture may still offer opportunity for more detailed scrutiny.

Originally it was hoped that information on the type and amount of fat-containing foodstuffs would provide an indirect measure of the degree of saturation of fats in the diet of a given group. It seemed too difficult, however, to gain a consistent picture of dietary fatty acids content by reconstructing the contributions of individual food items. Stiebeling has analyzed the survey data on fats in terms of saturated, oleic, and linoleic acid content in the four regions but provided no further breakdown by degree of urbanization or income, nor did she correct for the effect of non-usage.[7] This analysis suggested a somewhat higher ratio of unsaturated to saturated fatty acid in the South; the other three regions showed no appreciable dissimilarities in this regard.

It is not possible to extrapolate these findings to the more detailed ramifications of the populations into the areas and income groups discussed here. If the general conclusion is correct that no major differences in the consumption of fat-containing foods exist between the population segments considered, the same conclusion would generally apply to the constituent fatty acids.

SUMMARY

An analysis, based on the household food consumption survey made by the U.S. Department of Agriculture in the spring of 1955, of the consumption of calories, protein, and fat, and the major fat-containing foods, has been made. The consumption of "fats and oils," "dairy products," and "meat and fish" has been broken down into 19 different food items. For each of these, data are presented on the proportion of users of the various foods, their consumption level among the households using them, and the per capita consumption by the users. These data are further broken down by the four major regions of the United State, degree of urbanization, and income level. This report, differing in aim from others published, is based on calculations including only households actually using the food item rather than averages for the total group regardless of the proportion of users.

Epidemiological studies into the relationship between fat intake and atherosclerosis aim at delineating population segments differing in fat intake. The present analysis was undertaken in the hope that the extensive and detailed fragmentation of the total population by region, area, income, and proportion of users might identify subgroups exposed to possible preferential risk by a high intake of certain fats. Allowing for methodological difficulties, no such susceptible population subgroups could be shown to exist in the United States in terms of the particular breakdowns made. The feasibility of epidemiological studies of the kind envisaged within the United States would seem to depend, therefore, on identifying intragroup differences between individual members of the community rather than intergroup differences between broadly defined regional or socioeconomic population segments.

DOCUMENTATION NOTE

The complete set of 88 charts and the tables from which the charts were drawn, covering variations in the fat and oil consumption among the population segments defined by the U.S. Department of Agriculture survey of diet in the United States by household interview, have been deposited as document No. 6142 with

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Books received

Books received for review during the period from May 5 to June 5 are listed below. Reviews will be published as space permits.

ELECTROCARDIOGRAPHIC TECHNIQUES. A Manual for Physicians, Nurses and Technicians. By Kurt Schnitzer, M.D. Second revised and enlarged edition. Cloth. Pp. 109, with illustrations. Price $4.75. Grune & Stratton, Inc., 381 Fourth Avenue, New York 16, 1960.

EDEMA. Mechanisms and Management. A Hahnemann Symposium on Salt and Water Retention. Edited by John H. Moyer, M.D., Professor and Chairman of The Department of Medicine, Hahnemann Medical College and Hospital; and Morton Fuchs, M.D., Assistant Professor of Medicine, Hahnemann Medical College and Hospital. Cloth. Pp. 833, with illustrations. Price $15.00. W. B. Saunders Company, West Washington Square, Philadelphia 5, 1960.

THE CONCISE ENCYCLOPEDIA OF MODERN SURGERY. By James Hale Rutledge, B.S., M.D., F.A.C.S. Cloth. Pp. 308, with illustrations. Price $8.00. Chilton Company, Book Division, 56th and Chestnut Sts., Philadelphia 39, 1960.

PATHOGENESIS AND TREATMENT OF OCCLUSIVE ARTERIAL DISEASE. The Proceedings of a Conference held in London at the Royal College of Physicians of London, 13th-14th November 1959. Edited by Lawson McDonald. Paper. Pp. 237, with illustrations. Price $5.00. J. B. Lippincott Company, East Washington Square, Philadelphia 5, 1960.

THE INTESTINAL TRACT. Structure, Function and Pathology in Terms of the Basic Sciences. By Richard Paul Spencer, A.B., M.A., M.D., Helen Hay Whitney Research Fellow in the Department of Biological Chemistry, Harvard Medical School; formerly, Assistant Director of the Radioisotope Laboratory and Radioisotope School, National Naval Medical Center, Bethesda, Maryland. Cloth. Pp. 411, with illustrations. Price $12.75. Charles C Thomas, Publisher, 301-327 East Lawrence Street, Springfield, Illinois, 1960.

A PRIMER OF ELECTROCARDIOGRAPHY. By George E. Burch, M.D., F.A.C.P., Henderson Professor of Medicine, Tulane University School of Medicine; Physician-in-Chief, Tulane Unite, Charity Hospital; Consultant in Cardiovascular Diseases, Ochsner Clinic, Ochsner Foundation Hospital, Veterans Administration Hospital; Visiting Physician, Touro Infirmary; Consultant in Medicine, Hotel Dieu, Illinois Central Hospital, New Orleans; and Travis Winsor, M.D., F.A.C.P., Assistant Clinical Professor of Medicine, University of Southern California Medical School; Director, Heart Research Foundation, Los Angeles; Junior Attending Physician, Los Angeles County Hospital; Staff Member, St. Vincent's Hospital, Los Angeles. Ed. 4. Cloth. Pp. 293, with illustrations. Price $5.00. Lea & Febiger, Washington Square, Philadelphia 6, 1960.

CRASH INJURIES. The Integrated Medical Aspects of Automobile Injuries and Deaths. By Jacob Kulowski, M.D., F.A.C.S., F.I.C.S., Attending Orthopaedic Surgeon, St. Joseph's Hospital and State Hospital No. 2, St. Joseph, Missouri. Cloth. Pp. 1080, with illustrations. Price $32.50. Charles C Thomas, Publisher, 301-327 East Lawrence Street, Springfield, Illinois, 1960.

CARCINOMA OF THE THYROID GLAND. A Clinical and Pathologic Study of 293 Patients at the University of California Hospital. By

Stuart Lindsay, M.D., Professor of Pathology, University of California School of Medicine; Pathologist, H. C. Moffitt Hospital, San Francisco, California; Director of Laboratories, Sequoia Hospital, Redwood City, California; Consultant in Pathology to Letterman General Army Hospital, San Francisco, California; Oakland Veterans Administration Hospital, Oakland, California. Cloth. Pp. 168, with illustrations. Price $8.50. Charles C Thomas, Publisher, 301-327 East Lawrence Street, Springfield, Illinois, 1960.

Science and Psychoanalysis. Volume III. PSYCHOANALYSIS AND HUMAN VALUES. Edited by Jules H. Masserman, M.D., Professor of Neurology and Psychiatry, Northwestern University; Director of Education, Illinois State Psychiatric Institute, Chicago. Cloth. Pp. 377. Price $11.00. Grune & Stratton, Inc., 381 Fourth Avenue, New York 16, 1960.

ELECTROPHYSIOLOGY OF THE HEART. By Brian F. Hoffman, M.D., Associate Professor of Physiology, College of Medicine, State University of New York, Downstate Medical Center, Brooklyn, New York; and Paul F. Cranefield, Ph.D., Associate Professor of Physiology, College of Medicine, State University of New York, Downstate Medical Center, Brooklyn, New York. Cloth. Pp. 323, with illustrations. Price $12.50. McGraw-Hill Book Company, 330 West 42nd Street, New York 36, 1960.

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Children and youth in an affluent society*

Eveline M. Burns, Ph.D.
Professor of Social Work,
New York School of Social Work,
Columbia University

During the last decade we have experienced an increase of about 40 percent in the total volume of goods and services produced in the United States. Although population has also increased sharply in this same period, individual income receivers are markedly better off. Income per head at constant prices, which was $2,300 in 1950, will be about $2,800 in 1960, and in the next 10 years the average is expected to rise to about $3,500.

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nomic opportunity and an assurance of the satisfaction of their material needs. To a considerable extent, this has occurred. If we think only in averages, we do indeed find that children and youth are better fed and their physical condition is improving. Their educational attainments are undoubtedly rising. Job opportunities, too, are improving.

But concentration on averages gives a false impression of the impact of this remarkable good fortune which the Nation as a whole has enjoyed. Far too many of our children and young people have not shared in this increase in economic prosperity. Children on farms have in general been left behind: in 1959 the average income of the farm population was not quite 44 percent of that of the nonfarm population. Geographical disparities in family incomes are still glaring, though there is some indication that they are diminishing. The child living in Mississippi or Arkansas, where the average per capita income is only about half the national average, is unlikely to have access to the material comforts, the better housing and education, or the range of community facilities that we regard as "normal." Similarly, our economic gains have had much less of an impact on the children of nonwhite families. Whether we measure by average incomes, housing conditions, health standards, or educational attainments and job opportunities, the typical nonwhite family has lagged far behind the rest of the population in improvement.

Averages are misleading, too, if we fail to make allowance for the "bunching" of children in families. Unfortunately, income increases as the size of the family increases only up to the point where there are two children in the family. Thereafter, it actually decreases quite rapidly as the family size grows. Fifty-eight percent of the Nation's children are in families with three or more children.

In 1954, the last date for which we have detailed breakdowns, the median income of two-child families was $4,506, while that of five-child families was only $3,155. In that year 19.4 percent of three-children families, 31.7 of the four-children families, 47.8 of the five-children families, and 51.8 percent of the families with six or more children had annual money incomes equal to less than half the amount of the City Workers Family Budget. This is a budget based on a modest though adequate, rather than either a luxury or a subsistence standard of living.

Averages also conceal the fact that at any given time some families have no income of their own because the breadwinner has died, is unemployed or sick, or has deserted his family. Fortunately our social security system assures income to many millions who find themselves in such circumstances. But there are still too many gaps in the net of insurance protection: the benefits afforded in many instances are very low; in many families the breadwinner is excluded from coverage of unemployment insurance; only four States assure income to families when the breadwinner is temporarily disabled; and families with a permanently disabled father under 50 years old have no social insurance rights.

The thought that public assistance exists to fill these gaps may be a comforting one, but the reality is not very comforting to those who seek such aid. In 17 of our States, public assistance is denied in some or all jurisdictions to families with an employable member. Yet the time during which unemployment insurance benefits can be paid is extremely limited in most States, and there are many "depressed areas" characterized by persistent unemployment. Moreover, many thousands of needy families are denied aid from existing programs because of the operation of residence requirements, anachronisms in a society whose economic system requires workers to be mobile.

For those who are eligible for assistance, the public assistance programs provide monthly payments so low as to condemn the recipients to a life of grinding poverty. It is a curious and shocking irony that, in a nation which talks so much of its concern for the welfare of children and young people, the lowest monthly payments are granted in the two assistance programs where a large proportion of recipients are children. The average monthly payment per recipient of Aid to Dependent Children—with 2¼ million children on the rolls—was $28.71 at the end of 1959, and in some States it was far lower. General relief, where it existed at all, was making monthly payments averaging only $70.97 per case of approximately three persons.

Clearly, the impact of our rising pros-

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perity on the children and youth of this country is very uneven. The economic situation of many children living on farms, of nonwhite children, of children who reside in the poorer States, of children who reside in the poorer States, of children of large families, and of children who are the recipients of socially provided income, especially those supported through the Aid to Dependent Children program, should cause us to hang our heads as we reread the Pledge given to children at the conclusion of the last White House Conference on Children and Youth:

We will work to raise the standard of living and to improve our economic practices, so that you may have the material basis for a full life.

The impact of our rising levels of productivity and output upon the Nation's children and youth will, of course, be greatly affected by the forms in which the Nation decides to take its extra economic wealth—by the use to which we in fact put our good fortune. As income receivers, we are in theory free to spend our incomes as we individually wish. I say "in theory" because we are all, of course, influenced by the prevailing culture and values and by our exposure to the powerful pressures of advertising. As voters, we jointly decide how much of our economic resources shall be devoted to the kinds of goods and services that can only be provided by our freely elected governments acting on our behalf and how much shall be devoted to the kinds of goods and services that, as income receivers, we can buy on the open market. The outcome of these two types of decisions is not always what is in the best interests of our children and youth.

A major need of our children is education. In recent decades the Nation has considerably raised its sights as to the level of education we should aim to assure our children. But we have not been willing to allocate a large enough share of our rising productivity to making that promise a reality. True, in 1958-59 school expenditures accounted for 3.1 percent of the gross national product as compared with pre-World War II yearly averages of about 2.4 percent. But even this larger proportion of a larger national output has not sufficed to provide an educational system that meets our current standards. Schoolrooms are overcrowded, many school buildings are antiquated; and teachers are scarce and are likely to remain so until their salaries are brought closer to those offered to workers of similar training abilities and responsibilities. To add to the problem, the school population will grow by 29 percent over the next 10 years. Even if we are to hold our own, to give the children in this larger enrollment an education no better and no worse than present standards, we shall have to devote to this end a larger proportion of our increasing income. And if we are to remove present deficiencies, we shall have to increase the proportion even more.

Or again, we can look at housing. For a nation which lays so much stress on family life and so properly glorifies the home as the matrix of our culture, our unwillingness to devote an adequate proportion of our wealth to ensuring decent homes for all our families is little short of amazing. In 1956 the Bureau of the Census found that there were 13.1 million dwellings (24 percent of all dwellings) which were seriously substandard. Of this total, 4.2 million were "run down or neglected or of inadequate shelter or protection against the elements, or endangered the safety of the occupants." We must see that a larger fraction of our resources goes into housing (even if it means fewer gadgets or less elaborate automobiles or fewer private swimming pools) if our children and youth are to benefit as they could from our rising economic productivity.

One of the more disturbing developments of our time is the growing evidence of an increasing rate of family breakdown, whether measured by out-of-wedlock births, divorce rates, or family separation or desertion. The tensions of modern society, the complexity of life, and the precarious economic security of some sections of the population have meant that all too many families face problems of management, or of personal

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or emotional adjustment, in the resolution of which they need skilled help.

We know all this, and yet this knowledge is not reflected in the extent to which we devote resources to strengthening family life. The fraction of national product we devote to such welfare services as child welfare, family counseling, or rehabilitation has remained at .2 percent for 20 years.

In 1959 almost half the counties of the Nation, containing a quarter of our children, had no full-time child welfare worker. And we still use the major part of the meager resources we allocate to child welfare services for dealing with homes already broken, despite all our talk about the importance of prevention and keeping the home together. We complain about problem families and juvenile delinquency, but we do not insist that resources be made available either for training adequate professional personnel to deal with the people involved or for research that would enable us to understand better the nature and causes of these phenomena, and thus to develop more appropriate preventive and remedial measures.

Attainment of an allocation of our growing economic resources that will more surely redound to the advantage of the Nation's children and youth will make heavy demands on all of us. As individual income receivers, we need to reassess our spending patterns. This calls for the responsible cooperation of business, advertising, and the press, and a greater willingness on the part of all of us to support community programs, both voluntary and governmental, adequately even at the cost of reducing the proportion of our private incomes that we can spend exactly as we wish. The steps toward remedying these misallocations of our resources will not be easy ones. Yet we can hardly fail to take them if we are to fulfill the White House Conference's pledges of 1950:

We will provide you with rewarding educational opportunities, so that you may develop your talents and contribute to a better world . . . We will work to conserve and improve family life . . . We will provide the conditions for wholesome play that will add to your learning, to your social experience, and to your happiness.

We must also recognize that the very increase in productivity has involved by-products that affect children and young people in other than material ways. One cause of our rising national output has been the increase in the working population. And one source of this increase is the growing tendency for mothers to enter the labor market. In the years 1948-58 the number of mothers in the labor force increased by 80 percent and the proportion of all mothers who work by almost 50 percent. There were at least 3.6 million preschool children by 1957 with mothers in the labor force.

It is evident that when a mother is away from home some form of substitute care for the children must be provided. Yet, in 1958, as many as 400,000 children under age 12 had to care for themselves while the mother worked, and a third of these were less than 10 years old. Thus we are getting at least part of our increased output too cheap—at the expense of the children for whom we fail to provide day care centers, foster family day care, or homemaker services.

Our dynamic productive economic system has another unfortunate impact on children. One of the preconditions for an economic society characterized by rapid change and expansion is that the labor force shall be highly mobile, both occupationally and geographically. But to families and children the cost of this mobility may be high. Consider, for example, the situation of the 380,000 migrant farm workers and their families; their low and uncertain income; their unsatisfactory and often disgraceful housing; the interrupted or complete lack of education of their children; the limitations on their access to health and social services caused by their non-resident status; and among many of them the toiling of their children in the fields. The children of these migrant families can never hope to develop a sense of stability and security that comes from a feeling of "belonging" somewhere. What of them in relation to our 1950 pledge.

We will protect you against exploitation and undue hazards and help you to grow in strength.

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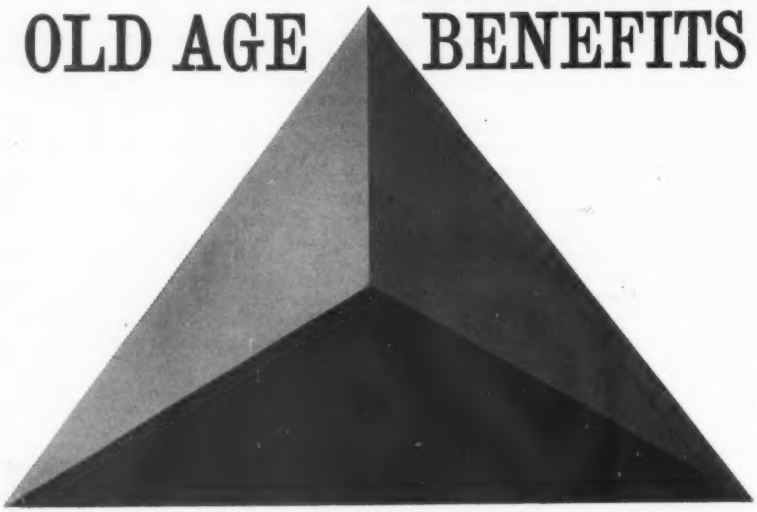

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guess at some of the effects of frequent moving upon the young. In addition to the effects on continuity of education, the loss of, or failure, ever to form lasting relationships with peer groups or with other persons in a familiar neighborhood, the lack of attachment to any community as "one's own"—these are some of the prices paid by children for our economically very important high worker mobility.

Of course, families no not move only in response to job opportunities. Much contemporary movement is due to the effort to secure better housing. Yet even here the impact is not always favorable. The trend to the suburbs has undoubtedly brought better and more wholesome housing and living conditions to several million children. But less thought has been given, in this movement, to the assurance of adequate educational opportunities or provision of community facilities for recreation, worship, and responsible self-government. Nor should we overlook the impact on children of the ever-lengthening "commuting time" daily undergone by the breadwinner. The father who spends 2 or 3 hours commuting to and from his job has that much less time to play his traditional role in family life.

If the movement to the suburbs has not been entirely a net gain for those who have moved, it has been little short of disastrous for many of those who continue to live in the central city. Increasingly, the core of our cities tends to be inhabited by the least economically mobile sections of our population or the newer arrivals. Their ability to afford decent housing is limited, and the capacity of the cities to build more adequate dwellings for them is restricted by the high costs of intracity building and the declining tax yields—caused by the departure of the better-off families and of industries seeking lower taxes and rents. Skyscraper apartments, dictated by economic considerations in building within the cities, are far from the ideal answer to the need for decent family living, especially where children are quite young. Moreover, opportunities for wholesome outdoor use of leisure time recede as the suburbs increasingly fill up the surrounding open spaces.

Worse still, the limited supply of decent housing has been accompanied by what seemed at first sight a reasonable attempt to develop priorities: public housing would be reserved first of all for the most needy, the poorest. In consequence, we now face a situation in which many of our metropolitan housing projects are too largely concentrations of problem or broken families or of people who are not moving upward economically. This, too, is an unfortunate environment for children, especially those in the older age groups. Is this kind of a depressed and one-class environment likely to implement another of our 1950 pledges:

We will help you develop initiative and imagination, so that you may have the opportunity freely to create.

Our economic progress has been predicated upon advances in scientific and technical know-how. All labor market forecasts indicate a rising demand for skilled technical and professional workers and indicate that the poorly educated, untrained worker will have increasing difficulty in finding employment. Almost 40 percent more young workers will be entering the labor force during the 1960's than did so during the 1950's. Are we attaching a high enough priority to ensuring that these young people are equipped with the training and skills that will be needed if they are to find jobs?

The task is more than just assuring better education: it also implies a great expansion of guidance and counseling services so that the increasingly expensive and highly specialized training required of workers will be made available in relation to the aptitudes and interests of different categories of young people and the probable long-range requirements of industry; and so that the young people entering the labor market will be enabled to make the best use of their talents and to equip themselves with the kinds of training that will enhance their opportunities for obtaining employment. Only so can we hope to avoid both a waste of valuable manpower and the social problem of unemployed, frustrated young people.

Consideration of the impact of economic developments upon our children and youth also suggests a problem involving values. We may be in danger of making economic progress an end in itself. Economic achievement and ad-

vancement carry social status and approval, and our concept of the good life includes a heavy, and some say, an almost exclusive, material component. These values are inevitably transmitted by our culture to the most sensitive element of our society, our youth.

Condoning as we do the glorification of economic welfare and its use as a status symbol, ought we to be surprised that some of our young people, whose levels of economic aspiration so vastly exceed their actual opportunities of achievement, become frustrated and despairing and work off their resentments in delinquent and antisocial behavior? When the good life is painted as being dependent on the possession of material goods and the attainment of satisfactions that can only be secured through the possession of money, should we be surprised that some young women recognize that these ends can be obtained more certainly by exploitation of their sex appeal than by employment in the low paid jobs that are available to them? And when the social climate seems to condone sharp practice and cheating, can we expect our young people to do other than draw the obvious moral: anything is permitted provided it brings economic success and you can get away with it?

Could it be that hitherto in our planning for the well-being of children and youth we have put rather too much emphasis on what goes on inside the family and the home, important as this undoubtedly is, and too little on the impact of the environment, economic, social, and cultural? Obviously, the influence of the home is of immense importance. It may well be a measure of our success in improving child rearing practices and fostering emotional security that not more of our youth react antisocially against the outside world when they leave the shelter of the family environment. But surely we aim to do more for our children than to equip them to tolerate frustration?

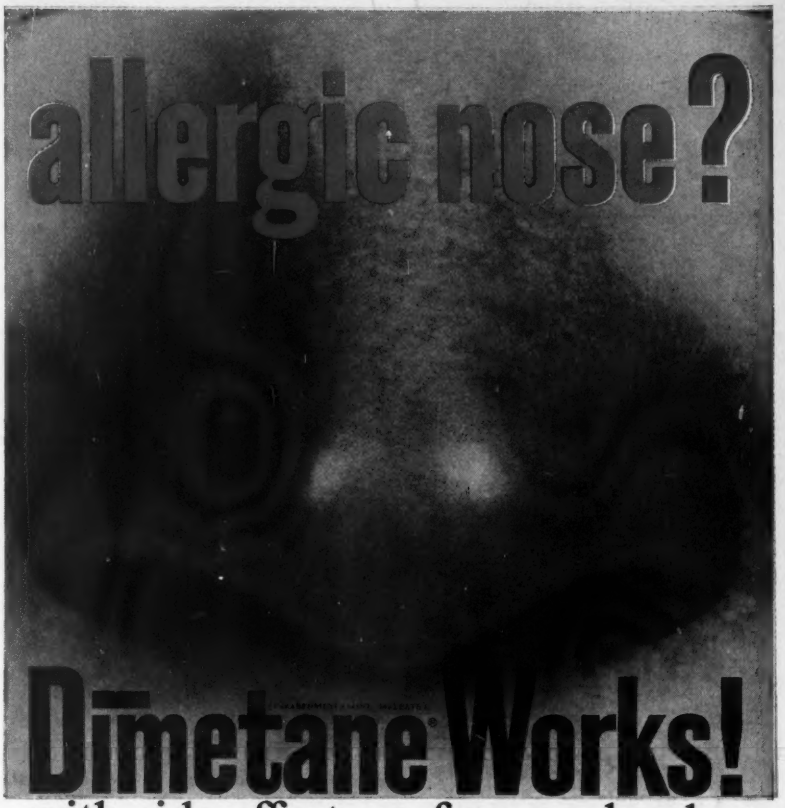
The problems of youth are significantly different from those of children, and our planning must reflect this fact. Youth is a period of looking outward, away from the family, and of assessing the world as it affects one's own future as an adult.

If all our children were assured the kind of home environment and opportunity that we know to be desirable and that our economic wealth makes possible, there would be no need for a White House Conference on Children and Youth. We are here to look facts in the face, to assess our achievements and our shortcomings as they affect our children and youth, and to search for ways of eliminating the black spots that still remain. As we "survey what we do," we shall probably find that some of our failures to attain our objectives are due to limitations of knowledge. There will be facts we need, but do not have as yet, about the extent of problems or their probable causes. There will be uncertainties as to the most effective remedies, and differences of opinion as to the best way to implement a policy even when all are agreed that it is a good one. But there are many problem areas where neither the facts, nor the desirable policies, are in dispute but where we have not yet made use of the knowledge we have.

We owe it to our youth not to evade this sobering confrontation of our stated objectives and pledges with our achievements. For young people are more literal-minded than we, who have already come to terms with the compromises and concessions that we blame on "the harsh realities of the real world." Like the child who saw that the emperor was naked, young people still expect us to mean what we say and to apply our precepts and our policies in everyday life. They are more shocked than we are by obvious discrepancies. More vulnerable to discouragement than we, for their values are as yet less fixed and their experience is briefer, they may react with a dangerous cynicism to the contrast between our achievements and our fine words and pledges about nondiscrimination, equality of access to the good things of life, and opportunities for development.

Let us, therefore, not be afraid to pinpoint our failures and to call upon the Nation—individuals, families, business, voluntary agencies, and all levels of government—to take the steps we believe to be necessary. Thus, even if we have to confess that we have not kept many of the pledges we made in 1950, we may yet live up to one:

We will illustrate by precept and example the value of integrity and the importance of moral courage.



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The expectation of life at birth in the United States reached an all-time high in 1959. Provisional mortality data for the 50 States, compiled by the Statistical Bureau of the Metropolitan Life Insurance Company, indicate that the average length of life was 69.7 years. This compares with about 69.5 years in 1958 and with the previous high 69.6 years registered in 1954 and in 1956; the figures prior to 1959 do not include Alaska and Hawaii.

The favorable longevity now enjoyed by the American people reflects the marked rise in living standards and the extraordinary advances in medical science and public health administration. Not many generations ago, the infectious diseases took a heavy toll of life year after year and not infrequently flared to epidemic proportions. The death toll was particularly heavy among young children. For example, in 1850 about one fourth of the newborn died before reaching their fifth birthday. According to the mortality conditions prevailing in 1901, not until age 25 are the number of newborn reduced by one quarter. For the babies born in 1930, the corresponding age is 49, and for those born in 1959 it is 63 years.

The age to which one half of the newborn survive has also increased substantially. Thus, according to the mortality prevailing around 1850, one half of the babies lived to celebrate their 45th birthday. That point advanced to about 58 years by the turn of the century, and reached age 67 in 1930. Under current conditions, one half of our newborn may expect to live almost 74 years.

The smallest gains are shown for the age at which the survivors from birth have been reduced by three quarters, due largely to our relatively slow progress in controlling malignancies, cardiovascular-renal conditions and the other degenerative diseases of middle and later life. Even so, one quarter of the babies born in 1959 can expect to live 83 years —an increase of 11 years over the figure for those born in 1850.

It is doubtful whether the record of life conservation during the past century will ever again be paralleled. It should be noted that there has been virtually no improvement in longevity since 1954. Some additional gains may be expected from continued declines in the death rates from tuberculosis, pneumonia and other infectious diseases; the toll from accidents may also be reduced. However, the greatest margin for improvement lies in the development of new weapons for postponing and treating the degenerative conditions, which now predominate at the middle and older ages.

*Reprinted from *Statistical Bulletin*, Metropolitan Life Insurance Company, March 1960.

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Mortality among overweight men*

Life insurance studies have consistently shown that overweight men experience a significantly higher mortality than men of average or less than average weight, and that the greater the degree of overweight the larger the excess mortality. The latest facts on the adverse effects of overweight on longevity are available from the Build and Blood Pressure Study, 1959, by the Society of Actuaries, which investigated the survivorship record of people accepted for Ordinary insurance during the period 1935-53 and traced to the anniversary of their policies in 1954. The new study indicates that even men who are overweight as early as their 20's experience an excess mortality; in previous investigations, a small degree of overweight at these ages was found to be a temporary advantage.

The excess mortality experienced by men according to degree of overweight and age at the time they were insured was tabulated. In the broad range of ages from 15 to 69 years, the mortality among men 10 percent or more overweight for age and height was one fifth higher than that for all persons insured as standard risks; among men 20 percent or more overweight, the excess mortality was about one third. The excess mortality rises rapidly with increasing degree of overweight, amounting to 13 percent for men 10 percent overweight, 25 percent for those 20 percent overweight, and over 40 percent for those 30 percent overweight. These figures unquestionably understate the excess mortality actually associated with extreme overweight, inasmuch as insurance companies, on the basis of previous experience, have exercised considerable care in the selection of extreme overweight risks, particularly at the older ages.

Overweight men who had no known minor impairment† likewise experienced a rise in excess mortality with increase in degree of overweight. However, the excess mortality was consistently smaller for them than for the entire group of overweight men, including those with minor impairments. In each group, the excess mortality tended to be somewhat higher among men who were 40-69 years old when insured than among those 15-39 years old at time of issue.

The penalty for added weight shows up even more clearly when the mortality among overweights is compared with that for the desirable weight range, that is, the weight groups recording the lowest mortality. Compared with the experience in this weight range, men 10 percent or more overweight have an excess mortality of one third; for those 20 percent or more overweight the excess is nearly one half.

Figures on expectation of life provide additional evidence of the adverse effects of overweight. For example, men 45 years of age who are of medium height and frame and weigh 170 pounds —close to the average—have an expectation of life 1½ years less than that for men of comparable build who weigh 150 pounds, which is within the range of desirable weights. Those weighing 200 pounds, or 35 pounds above the average, can expect to live 4 years less than the men weighing 150 pounds.

Overweight men are subject to an extra mortality whatever their height, but for the same relative degree of overweight the excess mortality seems to be somewhat greater among short men than among medium height or tall men. The excess appears to be somewhat greater for tall than for medium height men at ages under 40, but at ages 40 and over it is generally smallest among tall overweight men.

The excess mortality from the cardiovascular-renal diseases accounts in large measure for the high mortality among overweight men. Among men approximately 20 percent or more overweight, mortality from the heart and circulatory diseases—which is responsible for nearly half of the total mortality among these

*Reprinted from *Statistical Bulletin*, Metropolitan Life Insurance Company, Feb. 1960. This is the third of a series of articles dealing with the major findings and implications of the *Build and Blood Pressure Study, 1959*, recently published by the Society of Actuaries. This investigation covered the experience of several million people insured by 26 large Life insurance companies in the United States and Canada during the period 1935-53.

†A number of the men in this study, in addition to being overweight at the time they were insured, had some minor impairment, such as slight elevation of blood pressure, or minor circulatory or urinary impairments. None of these impairments, however, would bar the men from obtaining standard insurance. In fact, even the overweight men who were rated as substandard risks were so classified only because of their weight; in all other respects they were considered to be average or better risks.

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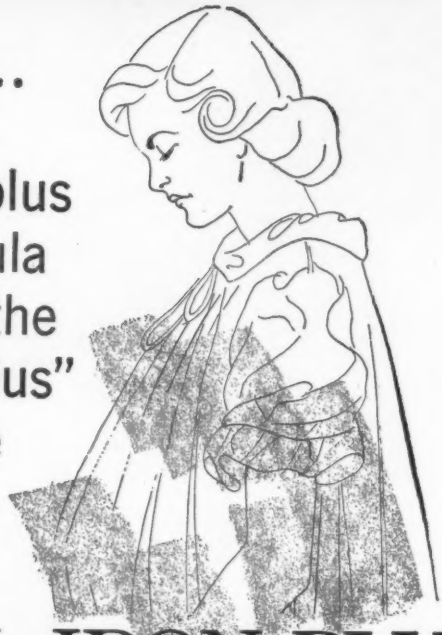

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1. Franklin, M., et al.: J.A.M.A. 166:1685, 1958. 2. A.M.A. Council on Drugs: J.A.M.A. 171:891, 1959. 3. A.M.A. Committee on Toxicology: J.A.M.A. 170:676, 1959.

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men—was more than two fifths higher than among standard risks. For cerebral hemorrhage and other vascular disorders of the central nervous system the excess mortality exceeded 50 percent, and for nephritis it was nearly 75 percent.

The mortality from diabetes among these overweight men was especially high, being more than twice that for standard risks. Nevertheless, because it accounted for only a small proportion of the deaths, diabetes contributed in relatively minor degree to the total excess mortality among overweight men. For digestive diseases, the excess mortality was 68 percent, reflecting mainly the increased frequency of biliary tract and liver disorders among overweight men. The mortality from pneumonia and influenza was one third above that for standard risks. Cancer recorded a moderately elevated mortality; according to an earlier study of Metropolitan Life Insurance Company experience, this may reflect a relatively high incidence of cancer of the biliary tract and the liver.

In view of the findings of the Build and Blood Pressure Study, 1959, the Metropolitan Life Insurance Company has embarked on a new weight control program. Inasmuch as men in their 20's and 30's have a distinct tendency to put on weight, the Company's program will be directed mainly at men in that age range. It is much easier to avoid habits of overeating, and hence overweight, in early adult life than to reduce weight past midlife. Weight control appears to be one of the most effective measures available to prevent or delay the onset of the major degenerative diseases and to extend the length of active, useful life.

Loss of life in violent storms and floods*

Tornadoes, hurricanes, and floods took about 3,100 lives in continental United States during the 10-year period 1950-59. The combined toll from these cataclysms varied considerably from one year to another, ranging from 85 lives in 1951 to a high of 663 in 1957. These data are based on reports by the Weather Bureau. In the decade as a whole, tornadoes caused about 45 percent of the fatalities, the remainder being almost equally divided between hurricanes and floods.

Tornadoes were responsible for slightly more than 1,400 deaths in the 1950's. Over a third of these fatal injuries were sustained in 1953 alone. On June 8 of that year, a series of tornadoes took 142 lives in Michigan and Ohio, most of them in the Flint area. The following day a tornado hit Worcester County, Mass., killing 90 people. In May of the same year a tornado caused 114 fatalities in Waco, Tex. The second highest number of deaths from tornadoes in the decade occurred in 1952, but the large majority of the 230 fatalities in the United States that year were caused by one series of storms which swept across the Missouri Valley in March.

The annual mortality from hurricanes fluctuates to a greater extent than that from tornadoes or floods. For example, there were only 10 deaths from hurricanes in the country as a whole during 1959 and not a single fatality the year before. In sharp contrast, the only hurricane to strike the United States during 1957 was responsible for a loss of approximately 390 lives, largely concentrated in Louisiana. This was the heaviest loss of life in any natural disaster in two decades.

Floods accounted for 834 deaths in the decade under review. In each of these years but one, the annual loss of life was less than 100. The one exception was 1955, when the victims numbered about 300; nearly 200 of them perished in floods resulting from the torrential rains accompanying the hurricane which hit the Northeastern part of the country on August 17-19. Most of the remaining flood deaths during 1955 occurred in California and other Pacific Coast areas, accentuating the unusual geographic distribution of such fatalities that year. Over a long period, the Ohio and Missouri regions have suffered the greatest losses.

In most years, the bulk of the deaths from tornadoes and from floods occur during the spring and early summer, whereas the death toll from hurricanes is very largely concentrated in the late summer and early fall. Yet, some of the greatest natural disasters in the decade occurred at unexpected periods. For example, although June is usually the worst month for floods, the heaviest loss in the 10-year period was sustained in August of 1955. Similarly, hurricanes are comparatively rare in June, yet that was the

*Reprinted from *Statistical Bulletin*, Metropolitan Life Insurance Company, April 1960.

month in which Audrey struck in 1957.

Various measures have been taken in recent years to reduce the loss of life in natural disasters. Efforts have been made to prevent floods by diverting rivers and by the construction of reservoirs and flood walls. Much has also been accomplished by flood warnings and by the evacuation of people from potentially dangerous areas. When hurricanes and tornadoes strike, the saving of lives still depends primarily on alerts and other warning services.

The American family today*

There were 44,200,000 families in the United States in March 1959, which included nearly 162,000,000 persons, or 92 percent of the country's population. Nearly 38,600,000 of these people were the heads of husband-wife families, an equal number were the wives of the family head, and 5,600,000 were other family heads. In addition, there were 17,300,000 adults other than family heads living with people related by blood, marriage, or adoption, and 61,800,000 children under 18 years of age.

Most family heads are relatively young. In 11¾ million families—one fourth of the total—the family head is under 35 years of age, and in 10¾ million the head is in the age group 35-44. At the other extreme, there are 6 million families in which the head is at least 65 years old.

Married couples account for at least 9 out of every 10 families in which the head is under 45 years of age. Although the proportion decreases with advance in age, married couples still comprise more than 3 out of every 4 families where the head is 65 years or older. Since most women outlive their husband, the proportion of families with a female head increases in later life. In fact, women represent one sixth of the family heads past age 65. In contrast, less than 3 percent of all families are headed by widowers or other men not currently married.

In the great majority of husband-wife families the wife is somewhat younger than her husband, but in about one eighth she is older than her spouse. More than one half of the wives under age 25 are married to men who are 25 years or older. Relatively few of the married women at ages 25-34 have a husband who is under age 25. It is also noteworthy that in about 2¾ million families both spouses are past age 65.

In husband-wife families there is an average of 1.44 children under age 18. Family responsibilities are even greater in families where the husband is aged 25-44 years. The average is 2.09 dependent children in families where the husband is 25-34 years of age and 2.29 children where he is 35-44 years old. Thereafter, the average number of young dependents per family decreases steadily as the children reach their 18th birthday, marry, or leave home for other reasons. Thus, in families where the husband is past age 55, the majority of the other family members are either adult sons and daughters or other adult relatives.

The average woman who heads a family also bears considerable responsibility for the care of young children. When she is under 35 years of age, there are about 2.26 children under age 18 per family. The average number of dependent children falls off with advance in age, but it still is as much as 1.25 per family for female heads aged 45-54; beyond age 55 it exceeds the average for husband-wife families. Female family heads past age 65—most of whom are widows—have nearly 400,000 dependent children in their care. This is more than one fourth of the youngsters in all families where the head is 65 years or older.

The number of families in the United States has been increasing rapidly in recent years. In 1959 there were 3 million more families than there had been five years earlier and about 5¾ million more than in 1949. Moreover, the number will continue to grow and is expected to exceed 60 million around 1980. In the light of these trends, it is fortunate that the American people are making provision for their future through life insurance and other forms of thrift. According to estimates by the Institute of Life Insurance, at the end of 1959 approximately 115 million policyholders in the United States owned more than 530 billion dollars of life insurance in private companies.

*Reprinted from *Statistical Bulletin*, Metropolitan Life Insurance Company, April 1960.

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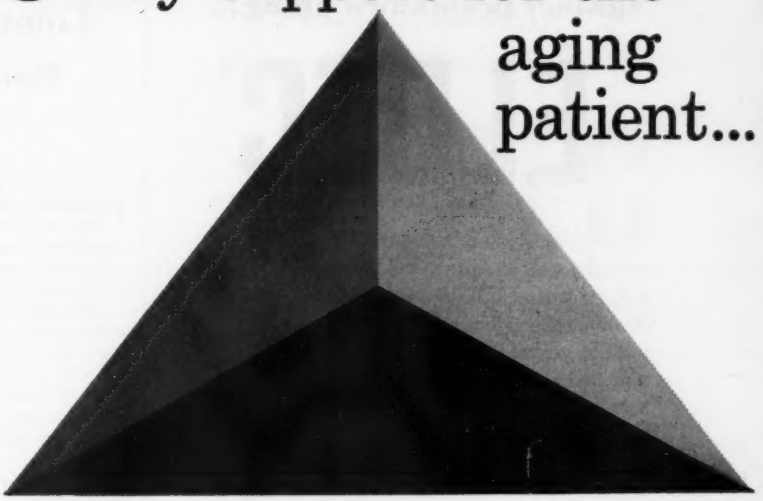

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Community Mental Health Management Reviewed*

To generate understanding of mental health in a community, professional personnel may well have a long, hard road to follow, Dr. Arthur J. Bindman and Dr. Lewis B. Klebanoff of the Massachusetts Department of Mental Health said, reporting on administrative problems inherent in establishing a community mental health program.

Although mental health is considered a virtuous and worthy cause, many varied attitudes are encountered. These attitudes must be understood and evaluated before professional personnel can work effectively for mental health in any locale, the authors stated. Goals cited for community leaders were the ability to see beyond individual interest in demands for service and to accept the limitations set by staff and budgetary boundaries.

Massachusetts was a pioneer, according to the authors, in establishing a mental health program based on local-State sponsorship of permanent mental health centers. This approach replaced traveling child guidance and school clinics, operating part-time on the local scene.

Community understanding, they said, may be encouraged by planned efforts in general mental health education, knowledge of the variety of services offered by a community mental health center, and promotion of support, both moral and financial. The authors urged emphasis on the partnership aspects of local and State participation and the use of the indirect approach in community organization.

A community mental health center, the authors suggested, can benefit from a clear pattern of communication and coordination between local and State departments; community acceptance through representation on advisory groups of organizations concerned with mental health; adequate financing; inservice training, standards, and salaries; and active relationships with schools and other caretaking agencies.

NEW JERSEY

The role of the local health department in mental health, as explored in a 2-day workshop conducted by State and local agencies in New Jersey, was reported by two participants, Dr. Jesse B. Aronson, director of the division of local health services, State Department of Health, and Dr. V. Terrell Davis, director of the division of mental health and hospitals, State Department of Institutions and Agencies.

The workshop, requested by a group of New Jersey health officers, opened the door to active local health department participation in programs of prevention and control. The authors said all participants stressed the need for wider use of available services, either in modified or expanded form, in any attack on mental illness in the community.

In general, there has been a tendency to consider mental illness as separate and apart from other diseases, the authors observed, with the following results: Local health departments have not considered mental health a primary public responsibility. Popular understanding of mental illness is delayed. Existing community facilities are not used as effectively as desirable, and in fact are duplicated in some instances at additional cost to the taxpayer. And treatment services are emphasized rather than preventive measures.

The health officer, because of his accepted position in the community structure, can perform the urgently needed function of coordinating independent community mental health services with existing community services for the prevention and control of other diseases, the authors concluded.

*Reprinted from *Public Health Reports*, March 1960.

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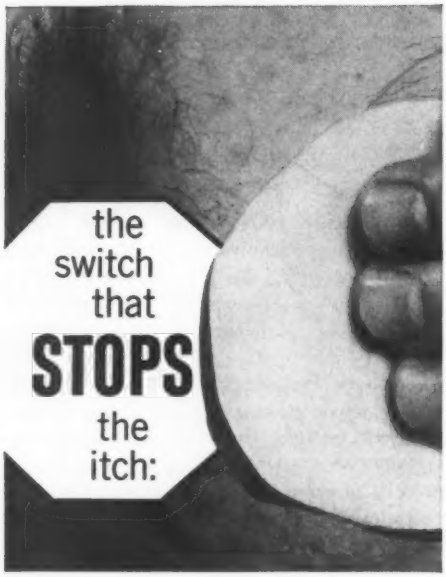

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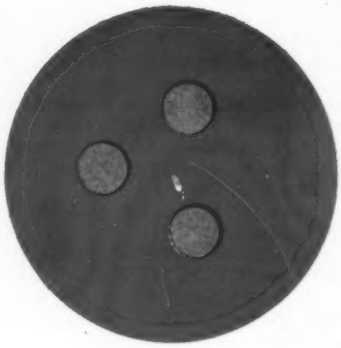

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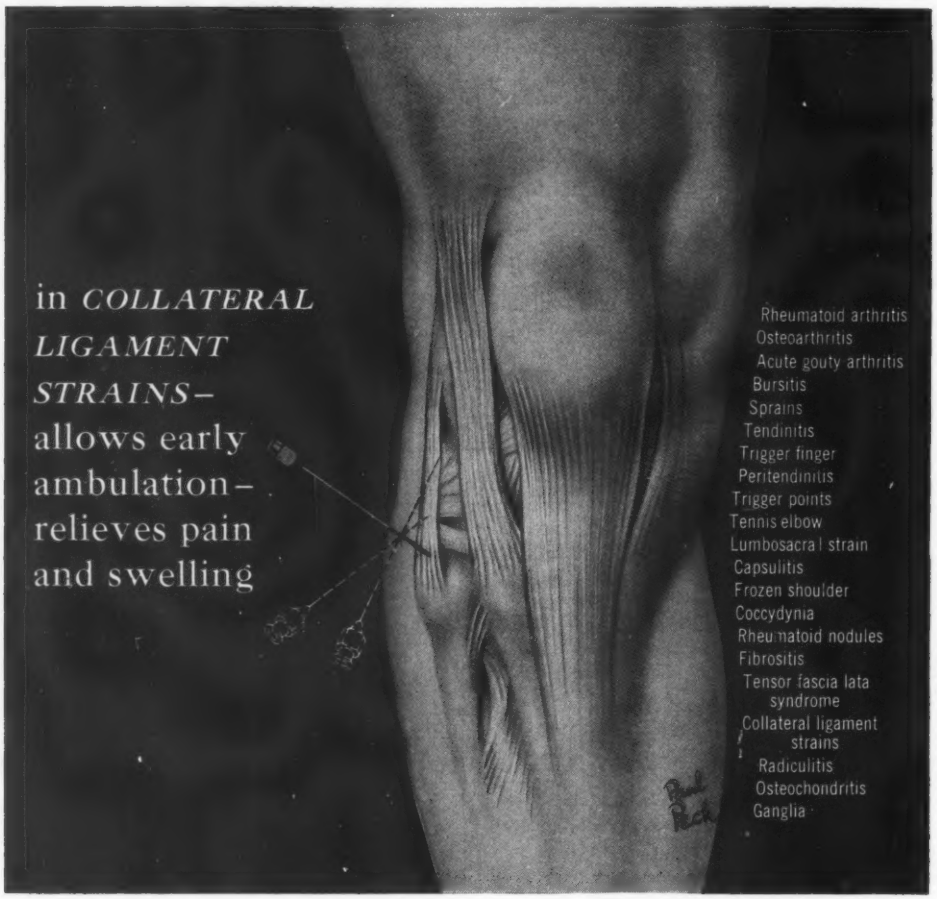

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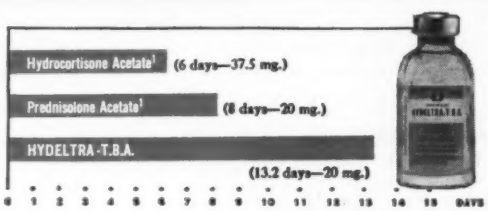
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(1) Hootnick, H. L.: Jnl. Amer. Ger. Soc., 4:1021-1030, 1956. (2) Cass, L. J. and Frederik, W. S.: Jnl. Lancet, 73:414-416, 1953. (3) Marshall, W.: So. Dak. J. Med. & Pharm. 8:151-153, 1955.

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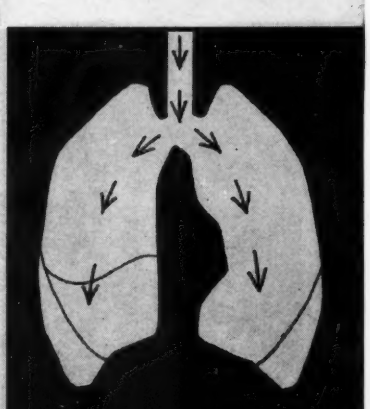

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